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### PREGNANCY AND LABOR COMPLICATED BY MYOMATOUS TUMORS OF THE UTERUS

RALPH E. CAMPBELL, M.D., F.A.C.S., MADISON, WIS.

*(From the Department of Obstetrics, Johns Hopkins Hospital)*

THE myoma in the pregnant woman has a far-reaching influence and may be an insuperable obstruction to labor. It has been pointed out that the fibroid tumor, embedded in the walls of the uterus, acts as a bar to conception; but, when pregnancy does occur, the results may be disastrous. The tumor interferes with the equable development of the uterus; and, therefore, frequently causes abnormal presentations, hemorrhage, immature births, infection, and high operative risk; any one of which may result in the loss of both mother and child.

Astonishing figures have been given showing the high operative incidence and the associated risk in this complication. Lafour<sup>1</sup> reported 300 cases complicating pregnancy, in which delivery occurred by the vaginal route and resulted in a maternal mortality of 40 per cent and a fetal mortality of 77 per cent. In 39 cases of forceps deliveries, Veit<sup>2</sup> reported a maternal mortality of 33 per cent with a similar figure for the children. Bland<sup>3</sup> had 87 versions which resulted in death for 64 per cent of the mothers and a fetal mortality of 83 per cent.

If the foregoing figures are to be accepted, we must agree with Barnes and Playfair<sup>4</sup> that the patient should be advised against incurring the risk of pregnancy; however, the picture is not so serious as these figures indicate.

Recent observers, such as Polak,<sup>5</sup> Pierson,<sup>6</sup> and others, have shown in their reports that we have benefited by correcting the sad experience of the early obstetricians who treated this complication with a high maternal and fetal mortality.

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In the series of 32,870 pregnant women covering a period of 32 years (1896-1928) admitted to the Woman's Clinic of the Johns Hopkins Hospital, I found 142 myomas recorded during pregnancy and labor, or an incidence of 0.43 per cent. Pierson<sup>6</sup> found 250 myomas in 30,836 pregnant women, or an incidence of 0.80 per cent, while Pinard<sup>12</sup> reported such a diagnosis in 84 of 13,915 cases, or a 0.60 per cent incidence.

Sixty of the 142 tumors in my series were so small as not to be considered of clinical importance, while in 82 cases the myomas gave rise to complications during pregnancy, labor, or the puerperium. Fifty-eight of these cases occurred in the colored race and 24 in the white; and 52 were primiparas and 30 multiparas. Table I shows the age incidence.

TABLE I

	PRIMIPARAS	MULTIPARAS
35 years or over	19	10
30-35 years	5	7
20-30 years	23	12
Under 20 years	5	1
	52	30

In 79 of the 82 cases, the records showed that 71 were married and 8 were single. Fifty-two of the 82, or 63 per cent, were pregnant for the first time; and only 18 women of the series had living children.

The above figures show that two-thirds of the tumors occurred in the colored race. There was a tendency for the tumor to be discovered at any time after twenty years of age; however, it may occur at an earlier age, as Gusserow<sup>7</sup> has reported cases in girls ten, fourteen, and sixteen years of age; while Anspach<sup>8</sup> found the tumor at birth. The foregoing statistics show the extreme age limits with a tendency for the fibroid to develop at a relatively advanced age both in primiparas and multiparas. Then, too, as the series shows, a woman between the ages of fifteen and twenty-five years is more apt to conceive than to develop fibroids; from twenty-five to thirty-five years of age the liability to both pregnancy and fibroids is greater; whereas between the ages of thirty-five and forty-five years, the liability to myoma is greatly increased and that to pregnancy decreased. One writer has pointed out that a barren uterus is more prone to the development of fibroids than one which has fulfilled its complete function by going through the hypertrophic and the involutionary changes of a gestation; the relative preponderance in the number of primiparas in this series would seem to justify such a statement.

All writers (Polak,<sup>5</sup> Lynch,<sup>9</sup> Pierson,<sup>6</sup> Lobenstine,<sup>10</sup> and others) agree that abnormal presentations, immature births (and in our series placenta



previa and premature separation may be added) are more common in pregnancy complicated by fibroid tumors. In our 82 cases normal cephalic presentations were present in only 62 per cent; face presentations were observed in two (2.4 per cent); and breech presentations in 10 cases (12.2 per cent); while transverse presentations occurred in 4 cases (4.8 per cent). Multiple pregnancy occurred twice (2.42 per cent); placenta previa three times as a complication (3.6 per cent); and premature separation of the placenta four times (5.1 per cent); while 12 abortions complete the series (14.7 per cent). Lafour<sup>1</sup> noted 49 per cent abnormal presentations in 100 pregnancies. Lynch<sup>9</sup> found 59 per cent cephalic presentations, 22 per cent breech, and 18 per cent transverse; and similar figures are reported by most investigators.

The three factors, sterility, immature birth, and premature labor, have been closely associated with fibroids, and the last two conditions contribute to the disastrous end-results when pregnancy occurs. As a working basis, we have considered the child as immature when it falls below 35 cm. in length and 1500 gm. in weight; as premature when these factors fall below 45 cm. and 2500 gm., and as mature when the latter figures are exceeded. In our entire series immaturity was observed twelve times; and prematurity nine times, four of the latter being stillborn; while mature stillbirths were noted in seven cases. Analysis of our figures shows that 32 of the 82 women, or 40 per cent, became pregnant for the first time only after a long period of sterility; and, as previously mentioned, only 18 women were mothers of living babies; 26 women, or 32 per cent, had histories of repeated immature births, and 11 of them had no living children. Investigation shows there is a relative degree of sterility as determined by the immature births and premature stillbirths. In other words, with only 18 mothers in possession of living babies as a result of these pregnancies, the relative sterility by immature births and the succumbing of the premature baby early in its existence, it would seem justifiable to regard the myoma as an important factor in sterility. In our series no definite percentage incidence can be accurately determined for sterility, as some of the women doubtless became pregnant later; but, in any event the report shows a rather high incidence of sterility. The probable causes of immature birth in pregnancy complicated by fibroids are: distortion of the uterine cavity; hyperirritability of the uterus; insecure embedding of the ovum, due either to an atrophic endometrium, or to edematous hemorrhagic changes occurring in an hypertrophied endometrium (see Figs. 1 and 2); and lastly, the degenerative changes frequently noted in the fetus itself. Pregnancy terminated by immature birth in a myomatous uterus has been observed by several investigators. Hofmeier<sup>11</sup> reported a 10 per cent incidence; Pierson,<sup>6</sup> 23 per cent; Pinard,<sup>12</sup> 15 per cent; and in our series, 14.7 per cent.

Several investigators have reported on sterility in myoma. Parvin<sup>13</sup> showed a general sterility in women of one to eight; and in fibroids, of one to three. Kelly and Cullen<sup>14</sup> reported 584 sterile women in 1149 fibroid cases, or 50 per cent incidence. These figures reflect the findings of most investigators. It is interesting to note that some observers state that sterile women tend to develop fibroids, which is apparently correct.

Other causative agents must not be overlooked in such a survey as this. Sampson<sup>15</sup> describes what he terms the "myomatous ovary" in as-



Fig. 1.—Cross section through a myomatous uterus in an acutely infected incomplete abortion. *a, b*, uterine cavity. *c*, Lining epithelium on opposite side of uterus to tumor. *c'*, Atrophic lining epithelium on the same side of uterus as tumor. *d*, Capsule of tumor. *e*, Normal myometrium. *f*, Myoma.

sociation with myoma uteri, and found that 17 of 150 cases of myoma uteri were associated with cystic ovaries; a condition mentioned also by other writers. Kelly and Cullen<sup>14</sup> recorded tuboovarian disease in 364 out of 934 myoma cases, and Young and Williams<sup>16</sup> in 35 out of 163 cases. Lastly, Tracy, quoted by Kelly and Cullen,<sup>14</sup> studied 3561 cases of myoma uteri and showed that the ovary was involved in 20 per cent. In the author's series the adnexal pathology was not reported sufficiently frequently to permit a definite conclusion. It must, however, be admitted

that adnexal disease associated with myoma uteri must have a direct bearing on sterility in certain instances. One investigator points out that the most important clinical fact relative to sterility is not that the uterus contains a fibroid, but depends upon its location and size. In the author's 29 cases which were studied grossly and microscopically, a single tumor was found eight times; a posterior wall tumor obstructing the pelvis and causing dystocia was noted in nine cases (see Fig. 3). My own observations show that the submucous tumor, the tumor distorting the uterine cavity, and the posterior wall tumor frequently terminate in immature birth. Histories of long-standing sterility prior to pregnancy were noted in many cases of submucous and posterior wall tumors. Schorler<sup>17</sup> found 16.6 per cent sterility in cervical fibroids; 24.17 per cent in interstitial growths; and 38.8 in submucous tumors. Young and

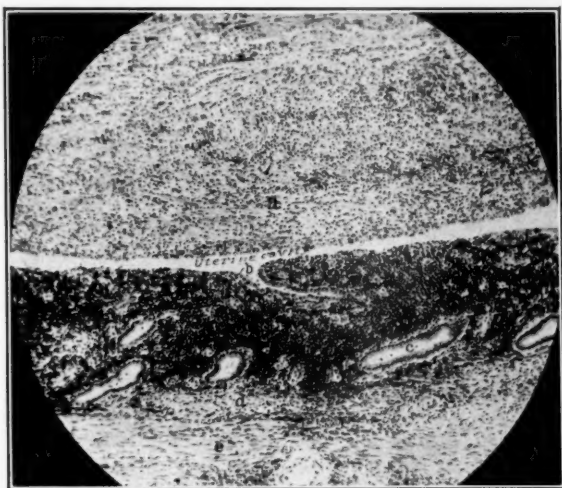


Fig. 2.—A higher magnification of Fig. 1. *a*, Myoma. *b*, Lining epithellum on opposite side of uterine cavity to tumor. *c*, A gland. *d*, Stroma with lymphogenous characteristics. *e*, Normal myometrium.

Williams<sup>16</sup> found 27 per cent sterility in the interstitial; 31 per cent in the submucous; and 42 per cent in the subserous varieties. The above figures, carefully analyzed, clarify and help to make certain what one would expect in sterility in regard to location of the tumor. Veit and Stoeckel<sup>30</sup> in their recent work have called attention to an interglandular dystrophy found frequently in conjunction with the fibroid uterus. Constitutional diseases are of prime importance in the causation of sterility, and malposition and developmental defects are of import. I wish to emphasize that only a few causes of sterility have been mentioned as occurring in association with fibroid tumors. While the fibroid tumor is of major importance in the diagnosis of sterility, it must not be overlooked that other conditions present may be the etiologic factors concerned.

It is not the aim of this report to go into the treatment of the fibroid uterus, but merely to mention the complications which occurred in our series. Mild degrees of discomfort were often experienced by the patient during gestation; pain was noted over the site of the tumor in 5 women; abdominal tenderness over sensitive tumors was observed in 4 cases. Gastric upsets manifested themselves in several instances, due, no doubt, to toxic absorption of the broken down tumor, or to pressure. Backache and pain radiating into the thighs were probably caused by pressure on the nerves. Varicosities of the lower extremities were observed in one case. A few patients complained of vague symptoms, such as weight and pressure in the pelvis. One patient suffered with pain over the bladder region, resulting from an anterior wall tumor; autopsy showed that the patient had a cystitis with urinary retention, a subsequent ureteral dilatation and pyelonephritis. Torsion of the uterus was observed twice and correctly diagnosticated once. Kelly and Cullen<sup>14</sup> and others have shown the seriousness of this complication for both mother and child, while Piquand and Lemeland<sup>18</sup> have shown by their operative experience the frequent fatal results of the complication. A rapidly growing tumor gave rise to respiratory and cardiac distress. Degenerative changes in the tumor signified themselves by pain, abdominal tenderness, a sensation of chills and malaise. Several operations were performed during pregnancy to relieve symptoms and conditions just mentioned, and will be discussed later under operative procedures.

Fibroids have a definite influence on the course of labor, which may be slow, tedious, and painful, and may result in abnormal presentations, early rupture of the membranes with subsequent ascending infection, uterine inertia, frequent operative risks, and death of both mother and child. Labor was closely observed in 61 cases. In 16, or 26 per cent, labor was prolonged; on the other hand, it was surprising to find that in 33, or 49 per cent, the duration of the labor was unusually short; while in 12, or 19 per cent, it was of normal duration. During labor, early rupture of the membranes took place in 23, or 37 per cent of the cases. It was of interest to note that in two cases pelvic tumors were pulled up out of the pelvis in the retraction of the lower uterine segment. Prolapse of the cord was experienced once. Adherent placenta was observed eight times and manual removal was necessary in each case. Postpartum hemorrhage occurred in 26, or 31.7 per cent of the series (hemorrhage was considered when the blood loss was over 600 c.c.). Four patients bled more than 1000 c.c. and the uterus was packed in each instance. Pierson<sup>6</sup> reported early rupture of the membranes in 44 per cent of his cases and Polak<sup>5</sup> cited a 45 to 60 per cent incidence, and also noted postpartum hemorrhage in 33 and 25 per cent of their cases respectively. Zangemeister<sup>19</sup> reported adherent placenta as a com-

plication and emphasized its relation to infection. Bland<sup>3</sup> reported 21 cases of adherent placenta; 13 of the patients died. Goodell<sup>20</sup> was one of the first to call attention to adherent placenta and the dangers of forcing the hand into a myomatous uterus, and thus opening up lymphatic channels to infection. I believe that adherent placenta is due to the absence of normal endometrium at the site of implantation of the ovum and to the consequent development of a defective decidua basalis. The term, adherent placenta, must not be confused with a retained placenta which has separated, but one which has failed to be expelled because of lack of expulsive power of the uterus, or may be impeded in its delivery by an obstruction in the uterine cavity. In my series, two patients had placentas which were separated but whose extrusion was obstructed by tumors projecting into the uterine cavity. Sampson,<sup>15</sup> Theilhaber,<sup>20</sup> Clark,<sup>21</sup> and others have pointed out the importance of the musculature of the uterus in regulating bleeding as well as aiding the uterine circulation; it is the muscular inefficiency in the fibroid uterus which seems to be of greatest importance in causing hemorrhage by preventing the control of the flow of the blood in the uterine plexus; the vessels denuded at the placental site are imperfectly constricted due to the aforesaid inefficiency. Defective development in the decidua basalis may be the contributing cause in the hemorrhage.

Ascent of the tumors heretofore mentioned was dependent upon the increase in size of the uterus, increase in the size of the tumor and the development of the lower uterine segment. Any pelvic tumor, as it increases in size and finds the pelvic cavity too cramped for its accommodation, tends to rise out of it. Furthermore, the increase in the size of the uterus with its corresponding elevation of the site of the attachment of the tumor, naturally tends to raise the tumor; and in labor with the development of the lower uterine segment, there is a tendency to remove from its obstructing position the very class of fibroids which is most likely to cause trouble.

In the puerperium, hemorrhage occurred twice, and submucous fibroids were diagnosed in each instance at curettage of the uterus. Twenty-six in 82 cases, 31.7 per cent, showed poor involution of the uterus. Puerperal infection was experienced in postabortal cases and also in a patient following term delivery. Necrosis of the myoma was observed in the puerperium in several instances and resulted in operative interference. It would seem that, with the retrograde changes taking place in the puerperium in conjunction with poor involution in a potentially infected field, a tumor lowered in vitality during pregnancy as a result of pressure, traumatized during labor, with its nutrition definitely affected in the puerperium when blood stasis and thrombosis are occurring, is very liable to necrosis and infection. The tumor of



low vitality readily becomes infected in case it is already the seat of early degenerative changes. Submucous fibroids are most apt to become infected after abortions or an infectious process in the puerperium; and the characteristic circulatory changes of involution tend to favor the progress of bacterial invasion. Infections are noted after curettage, intrauterine manipulation in which a portal of entry is afforded by

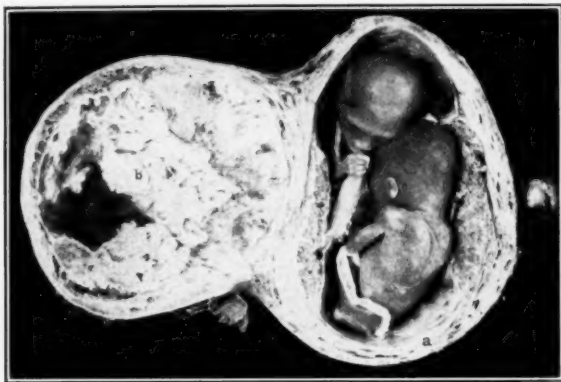


Fig. 3.—Posterior wall tumor obstructing pelvis. *a*, Fundus. *b*, Myoma. *c*, Extensive liquefaction necrosis of myoma with impending rupture of capsule.

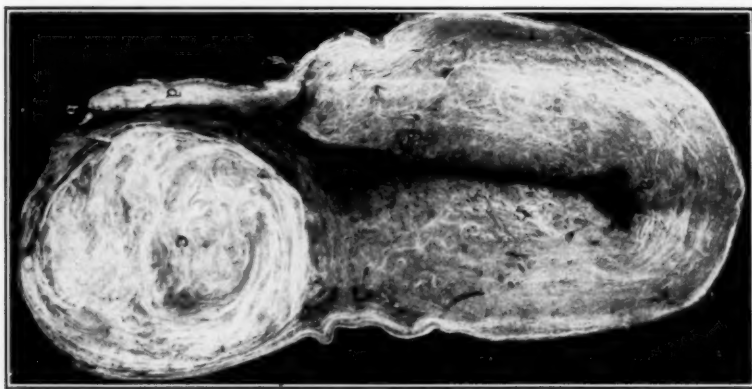


Fig. 4.—Pelvic obstructing tumor of the cervix. *a*, *b*, Uterine cavity. *a*, Fundus. *c*, Fibroid tumor. *d*, Anterior lip of cervix.

injury to the endometrium or dislodgment of the tumor, adhesions to pus tubes and the intestines may be the portal of infection.

A high operative incidence was noted in the series, as will be shown by the subsequent data. Several observers have had the same experience. In our series, the operative cases were divided into two main groups: the surgical operative group and the obstetric operative group.

## SURGICAL OPERATIONS DURING PREGNANCY

In the surgical group, pelvic obstructing tumors determined operations in seven cases (see Figs. 3 and 4). In all of them no serious symptoms supervened during pregnancy, and operation was deferred until shortly before the onset of labor, at which time cesarean section and supravaginal hysterectomy were done in those cases in which myomectomy was inadvisable. Occasionally a pelvic tumor may rise out of the pelvis in the development of the lower uterine segment and the growth of the uterus. One patient, in whom a pelvic tumor the size of a fist was found in the upper part of the cervix, and which gave every promise of offering a serious obstacle to delivery, was examined at the end of pregnancy when a cesarean section was to be considered; but, surprisingly, the tumor was found to have risen out of the pelvis, and spontaneous delivery eventually occurred.

In 4 patients, myomectomies were performed during pregnancy. One patient, four months pregnant, and having a history of several miscarriages, complained of bearing-down and cramp-like pains. This patient was given bed-rest for a short interval and subsequently a myomectomy was performed as it was thought that an abortion was inevitable in view of the previous history; a few months later, a spontaneous delivery occurred. The remaining 3 myomectomies were performed because of symptoms resulting from necrotic changes in the tumors. Degenerative changes in the tumor signified themselves by pain and abdominal tenderness at the site of the tumor, a sensation of chill, malaise, an elevated temperature, and an increased leucocyte count.

In two patients at term, cesarean section with myomectomy was performed. Cesarean section and supravaginal hysterectomy was performed in two other patients who were at term; in these cases, every effort was made to save the uterus. Another patient was operated upon during pregnancy in whom a beginning peritonitis had been diagnosed; a torsion of the uterus was found at operation.

## SURGICAL OPERATIONS DURING LABOR

A single operation was performed during labor; this patient was a primipara having weak labor pains, with the cervix failing to dilate, and membranes intact. The uterus was studded with small fibroids; a cesarean section was decided upon. As it was the patient's desire to have another child, a conservative operation was done. She was again delivered at a later date of a second child, when cesarean section and supravaginal hysterectomy were done.

## SURGICAL OPERATIONS DURING THE PUERPERIUM

Five patients during the puerperium developed necrotic tumors in which myomectomy was performed. The occurrence of fever and ab-

dominal pain directed one's attention to the necrotic process. In 3 women with postabortal infection associated with necrotic tumors, it was necessary to remove the uterus as a life-saving measure. A supra-vaginal hysterectomy was necessary in a patient with puerperal sepsis following term delivery. The surgical operative cases during pregnancy, labor, and the puerperium numbered 26, or an incidence of 31.6 per cent.

#### OBSTETRIC OPERATIVE PROCEDURES

The following obstetric operative procedures were carried out: 2 low forceps operations; 4 breech extractions; 2 manual dilatations of the cervix with extractions; 3 versions, including a Braxton-Hicks; and one bag induction. Obstetric operations numbered 12 in all, an operative incidence of 14.6 per cent (12 in 82 cases). These obstetric operative procedures in conjunction with the surgical group gave a total operative incidence of 46.2 per cent (38 in 82 cases). Pierson<sup>6</sup> reported a total operative incidence of 46 per cent; Pinard,<sup>12</sup> 35 per cent; and Lockyer,<sup>22</sup> 82 per cent.

An attempt was made to study the maternal and fetal mortalities in the operative series. The fetal mortality in the obstetric operative cases showed 3 immature deaths, one premature death, and a term stillbirth. In the surgical group immature births accounted for 6 deaths and 2 cases were stillbirths, one of which was macerated. The operative fetal mortality gave a 33 per cent incidence; if immature deaths were deducted, the incidence would be 10 per cent. The gross fetal mortality of the series was 28 per cent. Pierson<sup>6</sup> reports a mortality of 35.6 per cent; and Pinard,<sup>12</sup> 32.6 per cent.

The maternal mortality was studied and showed a total of 3 deaths. One patient died of intestinal obstruction following myomectomy; the second patient was admitted to the clinic in extremis and died of a ruptured, gangrenous, and abscessed uterus; the third patient died of pyelonephritis following myomectomy. Three deaths in 82 cases gave an uncorrected incidence of 3.65 per cent. The third case mentioned gave the history of long-standing kidney disease, and it seems unfair to charge it against the mortality. Pierson<sup>6</sup> reports a mortality of 3.2 per cent; and Pinard,<sup>12</sup> 3.6 per cent. Troel<sup>23</sup> reported 157 myomectomies with 23.9 per cent fetal and 3.9 per cent maternal deaths. Kelly and Cullen<sup>14</sup> in 6 myomectomies noted 2 fetal and one maternal deaths. Berger<sup>9</sup> reported 22 gangrenous, abscessed uteri; 3 in 9 of patients operated upon lived, and 13 others died. Frys, quoted by Lynch<sup>9</sup> reported 3 cases of gangrenous, abscessed uteri, with one recovery.

Neerosis is one of the most interesting complications of the tumor during gestation and in the puerperium. I made a special study of the tumors removed at operation from both pregnant and nonpregnant women. Tumors removed at operation from 29 pregnant women were

examined, and showed a definite necrosis in 22, or 75.8 per cent; in 7 cases necrosis was absent. As a control I studied tumors removed at operation from 64 nonpregnant women; necrosis was found in only 5 of the tumors, or 7.8 per cent; whereas no degeneration was found in 59, or 92.18 per cent; so that upon comparative analysis of the two series, the relation of necrosis in myoma in pregnant and nonpregnant women is 75.8 per cent to 7.8 per cent, or as 9 to 1. Other observers report similar findings in tumors removed from the nonpregnant. Bland-Sutton<sup>24</sup> believes that necrosis may be found on examination in nearly all tumors during pregnancy. This statement would seem to corroborate my findings; and I am convinced that necrosis during pregnancy occurs much more frequently than is generally believed and may be found in the great majority of myomas.

A definite explanation as to the cause of necrosis is still problematical. A few anatomic facts may help toward a better understanding of the production of the necrosis. The tumor is enveloped in its capsule which contains parallel muscle bundles of looser structure than the tumor, with the laminae separated by lymph spaces, and a large number of vessels, the majority of which are veins and capillaries. The blood supply of the tumor often depends upon a single artery, usually not more than 3; the venous network overshadows the arterial tree. Vantrín, quoted by Lynch,<sup>9</sup> points out that a fibroid lies loosely in a bed, as described above, and due to the rotary movements of the tumor caused by uterine contractions, the tumor may be dislodged easily from its bed with an interruption of its blood supply, ultimately ending in necrosis. There is little doubt that the anatomic structure of the tumor, in conjunction with the mechanical factors, plays an important rôle in the production of necrosis. I make little distinction between necrosis in general and the red necrosis so often seen during pregnancy and the puerperium. Red degeneration is only a stage in the evolution of the necrotic process, perhaps a more acute, rapid, advancing necrosis with a hemorrhagic infiltration and the subsequent deposition of blood pigment. By way of illustration: the red degeneration, commonly seen in a torsioned pedicle, is a mechanical process incident to a sudden disruption of the blood supply attendant with acute symptoms; and similarly during pregnancy and the puerperium, the mechanical effects of the uterine contractions upon the tumor in its loose bed may traumatize or disrupt the blood supply and produce the same effect as in the torsioned pedicle. Several investigators have advanced their own ideas as to the cause of necrosis. Leith Murray<sup>25</sup> suggested a hemolytic process with the deposition of blood pigment; Fletcher Shaw<sup>26</sup> established thrombosis as an etiologic factor; while Taylor<sup>27</sup> denied that thrombosis occurred in the majority of his 30 cases. I observed thrombosis in 2 cases, one of which was frankly infected; the process has been likened to cerebral

softening in which there is a central terminal artery; others have pointed out an ischemia due to the strangulation by the edematous, thrombosed capsule of the tumor; a few have noted the frequency of necrosis in interstitial tumors and have attributed this to increased contractions

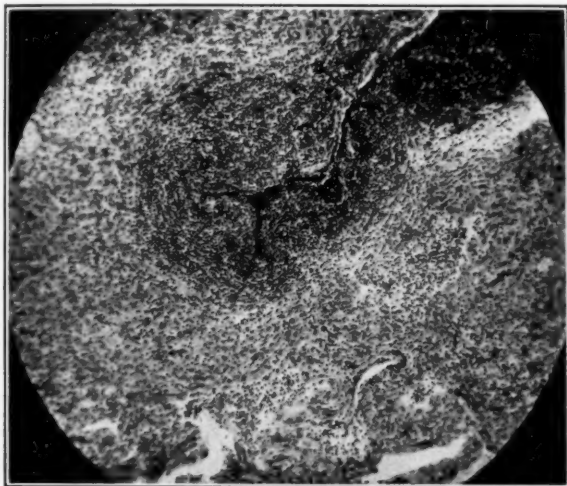


Fig. 5.—Cross section of cervix in ascending infection. *a*, Cervical cavity surrounded by cellular reaction.

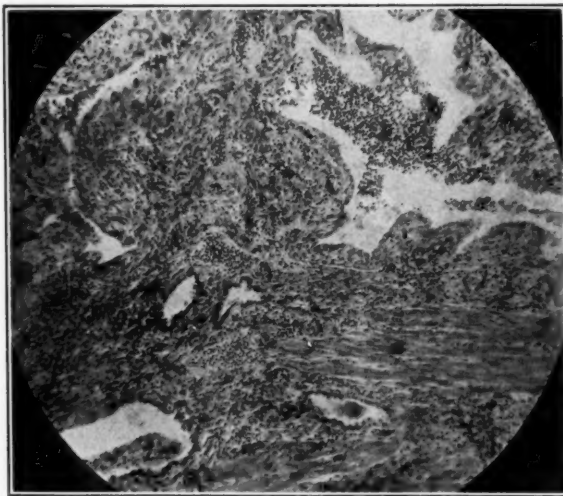


Fig. 6.—Same case as Fig. 5 with section taken higher up in uterus. *a*, Myomatous tissue. *b*, Focal areas of cellular infiltration. Note: Figs. 6 and 7 show the progress of ascending infection.

of the uterus; other workers believe there is a toxin of pregnancy; Leith Murray<sup>25</sup> stated that the lipoids in degenerating fibroids are antihemolytic and constitute an important factor in red degeneration; Shaw and Smith<sup>26</sup> sustain Murray; others, however, contradict them,



finding a lipoid increase in degenerating fibroids. In my own series I was impressed by certain tumors with round cell infiltration. The work of Von Franque<sup>28</sup> in recovering bacteria from myoma cases which were afebrile—and if I may also add the picture of lymphocytic infiltration occasionally seen—makes one believe that a low grade infection may lie dormant in these tumors awaiting a suitable change in environment to be lighted up. In addition, infection engrafted upon an early degenerative process may well result in frank necrosis. The relation of infection to necrosis was not lost sight of in this investigation; it is uncertain whether the necrosis in which infection occurs results directly from the infection or is incidental to it. Attention has been previously called to the frequent immature births associated with myoma uteri; in 3 cases of postabortal infection associated with necrotic tumors, it was

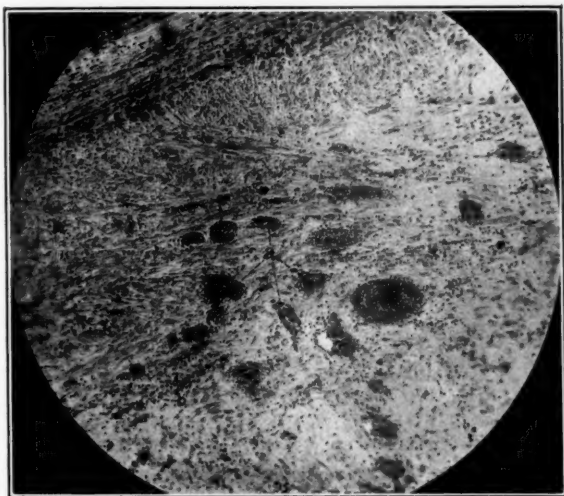


Fig. 7.—Myomatous uterus with phlebotic extension both into the uterine wall and myoma. *a*, Foci of phlebotic involvement.

necessary to remove the uterus as a means of saving the patient's life. Serial microscopic sections of the uterus in these postabortal infections showed that the infection could be traced from the cervix below to the fundus above, extending into the necrotic tumor by way of the lymphatics and blood; a marked thrombophlebotic process was observed in one uterus, and a definite lymphatic involvement was noted in another (see Figs. 5, 6, and 7—serial sections from a case of infected abortion). If infection is to play an important rôle in the myomatous uterus during pregnancy and a prominent part in its association with tumor necrosis, it must be remembered that the following predispose to infections: long labors, early rupture of the membranes, adherent placenta, subinvolution, and frequent obstetric manipulations. Any one of the foregoing conditions may lead to infection, with the subsequent loss of both mother and child.

The author is not alone in mentioning the serious import of infection aside from its relation to necrosis and feels that not enough emphasis has been placed on infection as an adjunct to myoma in complicating pregnancy. In this series, if radical cesarean section had not been

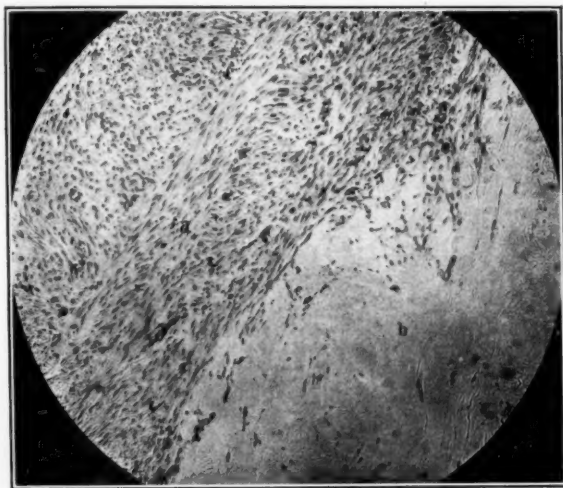


Fig. 8.—Section showing necrosis in a myoma. *a*, Typical myoma. *b*, Necrosis.

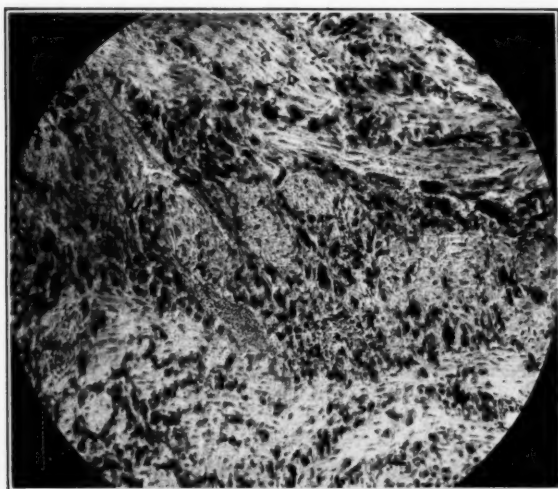


Fig. 9.—Fetal cell invasion of a myoma. *a*, Tumor cells. *b*, Fetal cells.

resorted to, a great many more patients would have died as the result of infection. The treatment of infection demands the greatest amount of perspicacity, and is, in short, a problem of "what not to do as well as what to do."

In the detailed study of 29 tumors removed at operation during pregnancy, liquefaction necrosis or cystic degeneration and other types of degeneration were commonly seen (see Figs. 3 and 8); red degeneration was noted in both the puerperium and during pregnancy; calcification of the tumors was frequently observed; and adenocarcinoma was found engrafted upon one tumor; the decidua was carefully studied in these uteri removed at operation and showed in some a marked inflammatory reaction; unusual fetal cell invasion was noted in a few cases (see Fig. 9). Vascular obliteration was found in several tumors; thrombotic changes were noted twice; and one neoplasm showed fetal cell invasion of its vessel walls. Unusual fetal cell invasion of the tumor was noted seven times; it must be assumed in these tumors that there is a tendency for the ill-developed decidual barrier to offer a diminished resistance to the trophoblastic cell invasion.

#### SUMMARY AND CONCLUSIONS

1. The incidence of myoma in 32,870 pregnant women was 0.43 per cent, or 142 tumors were diagnosed. In 82 of the 142 fibroid cases, the patients had tumors of such importance as to complicate pregnancy, labor, or the puerperium.

2. The greater number of tumors were found in the colored race, and were observed more frequently in primiparas. The liability to fibroids was greatly increased between the ages of thirty-five and forty-five years.

3. Sterility, premature labor, and immature birth were closely associated with the fibroid complication. There is doubtless a relationship between the tumor and sterility. Immature birth and premature labor were observed in 25 per cent of the cases.

4. Mild degrees of discomfort were noted during pregnancy; severe and impelling indications frequently resulted in obstetric and surgical operative procedures.

5. Labor was often tedious, painful, and prolonged. Early rupture of the membranes took place in 37 per cent of the cases. Hemorrhage was a disturbing factor in 31 per cent. Adherent placenta was observed eight times. Twenty-six of the cases showed poor involution of the uterus. Infections were not uncommon.

6. Major surgical operative interference was necessary in 31.6 per cent of the cases. Obstetric operative procedures were performed in 14.6 per cent. The total operative incidence was 46.2 per cent.

7. Necrosis was found in 75.8 per cent of the tumors removed during pregnancy, compared to an incidence of 7.81 per cent from nonpregnant women, a ratio of 9:1.

8. Infection is not sufficiently emphasized in the literature as an important factor and an added danger in the fibroid complication; this series substantiates such a statement.

9. The gross fetal mortality for the series of 82 was 28 per cent. The gross operative fetal mortality was 33 per cent.

10. The gross maternal mortality was 3.65 per cent.

A better understanding of the obstetric principles involved in the fibroid complication with a replacement in certain patients of an attempt at delivery per vagina by the surgical operative route, notably cesarean section or cesarean section and hysterectomy, has led to an important evolution in the treatment of the complication. A clearer conception of the relative importance of necrosis and infection to the fibroid complication with an early recognition and proper treatment in both has saved a great many lives. The ability to evaluate and treat the less serious, though important, complications, such as early rupture of the membranes, inertia uteri, and subinvolution has added greatly to a favorable prognosis. The prevention of unnecessary obstetric manipulation has lessened a considerable risk. In the last analysis a complication of pregnancy has been reduced from an unfavorable prognosis for both mother and baby to one in which a more favorable outcome may be predicted.

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## THE EFFECT OF EXTRACTS OF THE URINE OF PREGNANT WOMEN ON THE HYPERPLASTIC ENDOMETRIUM

HAROLD H. KLINGLER, M.D., AND JOHN C. BURCH, M.D.,  
NASHVILLE, TENN.

*(From the Department of Obstetrics and Gynecology, Vanderbilt University School of Medicine)*

RECENT reports on the efficacy of the so-called anterior pituitary luteinizing hormone in the treatment of functional uterine bleeding have been most encouraging. The hormone is obtained by extraction of the urine of pregnant women. It was first discovered by Zondek and Aschheim and due to the similarity of action between it and anterior lobe substance, it was called prolan. Reichert, Pencharz, Simpson, Meyer and Evans<sup>1</sup> have recently shown that the substance has no effect on the ovaries of the hypophysectomized animal. Hill and Parkes<sup>2</sup> were able to produce ovulation in the hypophysectomized animal with urine of pregnancy in only four instances out of nineteen. This work casts some doubt on the hypophyseal origin of the hormone and suggests that it is derived elsewhere and acts on the hypophysis, the excessive stimulation of the hypophysis in turn producing the changes in the ovary. Collip<sup>3</sup> has found a similar substance in the placenta. Burch and Cunningham<sup>4</sup> have been able to increase slightly the ovarian stimulating capacity of the hypophyses of spayed rats by the injection of placental extract. In a further series of experiments<sup>5</sup> from this laboratory, we have also been able to increase the ovarian stimulating capacity of the hypophyses of spayed rats by the use of an estrin-free placental extract.

While the hormone is generally regarded as being of hypophyseal origin, the evidence of a placental origin, however, must obviously be considered. In this connection it is interesting to note that Goldstine and Fogelson<sup>7</sup> obtained excellent results in the treatment of uterine hemorrhage by means of an alcoholic placental extract. Campbell and Collip also obtained excellent results with Collip's anterior pituitary-like fraction.<sup>8</sup> In the discussion of Novak and Hurd's paper<sup>9</sup> on the results obtained with the so-called anterior pituitary luteinizing hormone, Geist<sup>10</sup> reported a series of 22 women who were treated with this material preoperatively and whose ovaries showed no excessive luteinization. In closing the discussion, Novak<sup>11</sup> expressed the belief that the effect of bleeding is not due to the histologic effect but to an effect on some unknown bleeding factor.



Whether or not such a factor exists and if it does what its nature may be cannot be stated at present. Inasmuch as the endometrium is the actual point of the bleeding, it seemed advisable to study the endometrium at the various stages of the disordered cycle. It is of

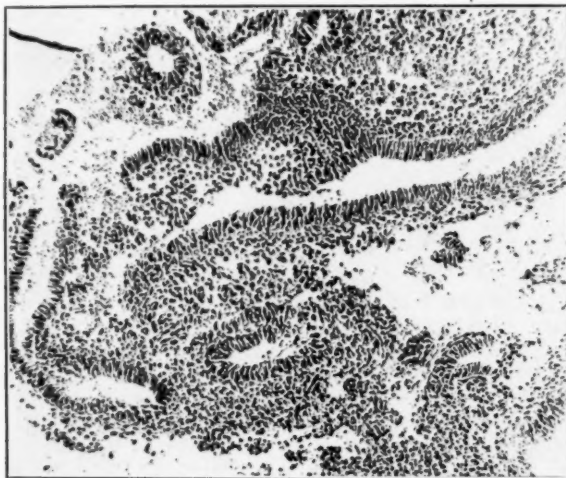


Fig. 1.—Section of endometrium taken by cannula-aspiration method on February 10, after patient had been bleeding for two months.



Fig. 2.—Specimen of endometrium obtained on February 25, patient having received injections of the extract for the preceding three days.

course impossible to curette a patient as frequently as material is needed for a study of this kind. In order to overcome this difficulty we used a metal cannula which was easily inserted into the uterus. When the cannula came to rest against the uterine wall, strong suction was made with an attached syringe. Sufficient tissue was always

obtained for study. By this method we were able to secure ample material and at the same time not to remove so much material that we would have to consider the factor of regeneration between biopsies. This method has been reported elsewhere.<sup>1</sup>



Fig. 3.—Biopsy of endometrium obtained on March 27, sixteen days following cessation of bleeding and five days preceding onset of bleeding.

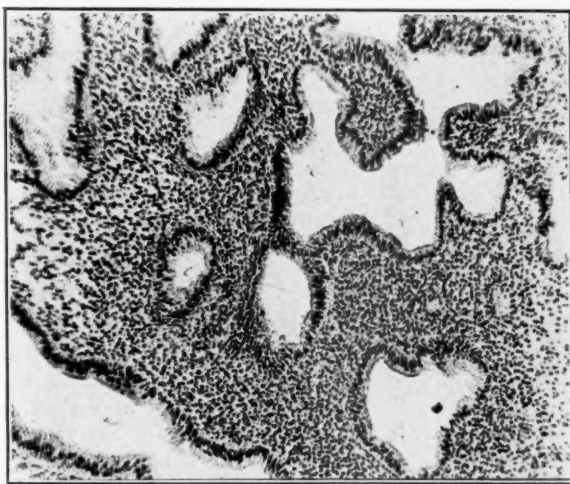


Fig. 4.—Endometrium taken on April 21, seven days following cessation of bleeding.

The following case report illustrates the effect of the extract in a case of endometrial hyperplasia.

#### CASE REPORT

Mrs. O. G. is a white, thirty-eight-year-old married nullipara, admitted to the Vanderbilt University Hospital Feb. 2, 1932, with chief complaint of flooding.

<sup>1</sup> Present History: Periods irregular for the past four years. During the past year she had had only four periods. Seven weeks before admission she began

menstruating. At first the flow was scanty; but later it became very profuse. There had been mild pain in the left lower quadrant. She had had no dysmenorrhea and no leucorrhea. The sella turcica appeared normal in the roentgenogram. Basal metabolic rate was minus 3 per cent. On February 10, a section of the endometrium taken by biopsy showed relatively dense stroma and numerous glands with widely varying lumina. The glandular epithelium showed marked pseudostratification and the diagnosis of cystic glandular hyperplasia was made (Fig. 1).

On February 22 the patient was still bleeding. Twelve units of the extract (Antuitrin S.) were given intramuscularly. Thirty-seven units of the extract were given on February 23 and again on February 24. On February 25 patient was bleeding slightly. Twenty-five units of the extract were given. A section taken by biopsy at this time showed considerable proliferation of the glandular epithelium. There was a moderately dense stroma. There was clearly no evidence of progestational proliferation of the endometrium. The epithelium was of the interval type and was similar to that seen following the injection of estrin in castrated animals (Fig. 2).

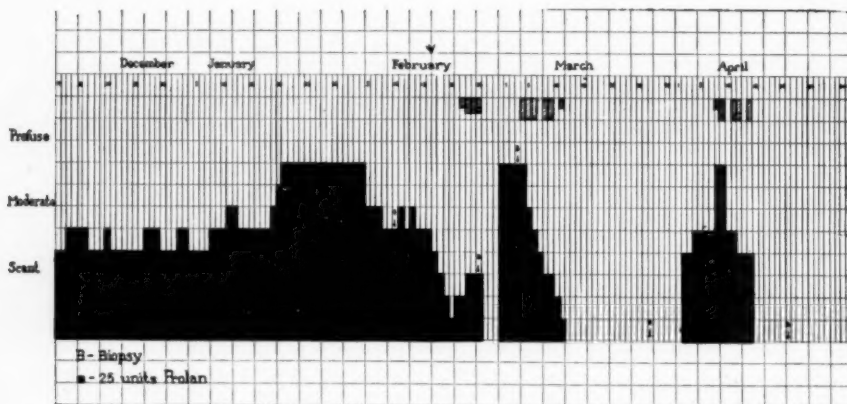


Fig. 5.—Graphic record of bleeding in relation to treatment and biopsies. Black blocks represent bleeding.

On March 3 the patient was bleeding profusely. A section of the endometrium taken by biopsy showed glands of irregular size. The epithelium was markedly pseudostratified and mitoses were present. Underneath the surface epithelium an occasional polymorphonuclear leucocyte was seen. On March 4 the patient was bleeding moderately. One hundred units of the extract were given. On March 5 patient was bleeding moderately. One hundred units of the extract were given. On March 6 patient was bleeding moderately and a hundred units of the extract were given. On March 7 patient was bleeding slightly. One hundred units of prolan were given. On March 9 there was practically no bleeding. One hundred units of the extract were given. On March 11 there was only slight spotting. Fifty units of the extract were given at this time.

On March 27 there was no bleeding. A section of the endometrium taken by biopsy showed the typical Swiss-cheese pattern with marked pseudostratification of the epithelium. There was dense stroma and the glands were dilated (Fig. 3).

On April 2 bleeding started again but patient did not return to clinic.

On April 8 the patient returned to the clinic and received treatment, with immediate diminution of flow. Bleeding ceased on April 14.

On April 21 she returned to clinic and another endometrial biopsy was obtained which showed no marked histologic changes (Fig. 4).

Fig. 5 graphically illustrates the effect of the extract and gives the relationship of treatment to biopsies.

#### SUMMARY

This case clearly illustrates the beneficial effects of the extract of urine of pregnant women in a case of endometrial hyperplasia. It also illustrates the fact that the extract may exercise its immediate effect without producing progestational proliferation. However, it is entirely possible that progestational proliferation may occur at some future time in this case.

We are indebted to Parke, Davis & Company for a liberal supply of Antuitrin S.

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Irving, F. C.: *Treatment of Eclampsia by Plasmapheresis*, New England J. M. 203: 1070, 1930.

The writer reports results with the treatment of eclampsia by means of plasma removal or plasmapheresis, as first performed in experiments by Abel, Rowntree and Turner. The procedure is as follows: A liter of blood from the vein at the elbow is drawn under sterile precautions into a sodium citrate solution. It is centrifugalized for twenty minutes. After removal of the supernatant plasma, normal saline is added to the remaining corpuscles. After another centrifugalization the corpuscles are finally mixed with enough fresh salt solution to make one liter which is reinfused into the patient.

The withdrawal of 1000 c.c. of blood is almost always followed by a rapid and marked fall of blood pressure. If convulsions cease nothing further is done. Convulsions, twitching or a marked rise in blood pressure are indications for repetition of the plasmapheresis. Of the 17 eclamptic patients treated, 12 required this procedure but once, in 4 a second and in one a third plasma removal became necessary. Only one patient died, as a matter of fact, of pneumonia and empyema on the sixteenth day. Of the 17 babies 8 died, 6 of them before labor was ended.

EHRENFEST.

A CLINICAL STUDY OF 403 CASES OF ADENOCARCINOMA OF  
THE OVARY: PAPILLARY CYSTADENOMA, CARCIN-  
OMATOUS CYSTADENOMA, AND SOLID ADENO-  
CARCINOMA OF THE OVARY

L. MARY MOENCH, M.D., ROCHESTER, MINN.

*(From the Division of Medicine, The Mayo Clinic)*

THE major group of the malignant neoplasms of the ovary consists of adenocarcinoma. Sarcomas and teratomas occur with such infrequency that when found they often elicit a report of the individual case. Adenocarcinomas, however, representing the general group of malignancy of the ovary, are significant because of their common occurrence, and the statistical opportunity they afford to study certain features of the group as a whole. Such a study is presented here, and an attempt has been made to compare the clinical symptoms and final results with surgical and pathologic data. The study included all cases of clinically malignant adenomas of the ovary considered operable and in which operation was performed at The Mayo Clinic in the period of eleven years between January, 1917 and December, 1927, inclusive. Extensive recurring carcinoma, and abdominal carcinomatosis considered inoperable, in cases in which exploration only was undertaken, were excluded as unsuitable for the study.

With the purpose of bringing out any inherent differences in malignant potentialities, the following morphologic types of adenocarcinoma of the ovary were recognized: papillary cystadenoma, carcinomatous cystadenoma, and solid adenocarcinoma. The group consisted of 403 cases, the growths in 254 of which were papillary cystadenomas: in 72, carcinomatous cystadenomas, and in 77, solid adenocarcinoma.

INCIDENCE BY AGE, AND PAST HISTORY

The different neoplasms affected patients of the following average ages: papillary cystadenoma, forty-six and nine-tenths years; carcinomatous cystadenoma, forty-six and seven-tenths years; solid adenocarcinoma, forty-eight and thirteen-hundredths years. Of those who had the different neoplasms, the ages of the oldest patients were as follows: papillary cystadenoma, seventy-three years; carcinomatous cystadenoma, sixty-four years; and solid adenocarcinoma, sixty-nine years, while the youngest patients in the three groups were sixteen years, one and seven-tenths years, and nineteen years, respectively. It was noted that these types of malignancy occurred most frequently in the fifth and sixth decades of life. The drop in the seventh and eighth decades may



be attributed to decrease in the number of persons who, under any conditions, would be alive at those ages, rather than to lowered susceptibility to the disease in later years of life. There was no outstanding difference in the incidence by age in the three groups.

The three types of neoplasms were distributed among married and single women as follows: papillary cystadenoma, 29 single and 225 married women; carcinomatous cystadenoma, 14 single and 58 married women; solid adenocarcinoma, 18 single and 59 married women. Of the 225 married women who had papillary cystadenoma, 152 had had children; the same was true of 47 of the 58 married women who had carcinomatous cystadenoma and of 41 of the 59 married women who had solid adenocarcinoma. A family history of carcinoma was noted in 83 of the 403 cases, or 20.6 per cent. Except in cases in which the disease was extensive there was little unfavorable effect on the general health. Previous operations on the ovary were recorded to designate the possibility of etiologic factors; there were 19 such operations. The small number of operations on the breast, there were 8, did not suggest any association between the lesions of the ovary and those of the breast.

#### SYMPTOMS

The histories of menstrual and pelvic difficulty were analyzed for abnormalities which might be of diagnostic value. Interference with normal ovarian function was indicated by change in periodicity of menstrual bleeding and by abnormal loss of blood in menstruation. There were no consistent changes that could be considered characteristic of the disease except as general indications of interference with ovarian function. Amenorrhea of the menopause was present in 192 of the 403 cases (47.64 per cent). Metrorrhagia or a bloody vaginal discharge was a significant symptom when found, but was not a consistent symptom. It occurred in 32 (12.59 per cent) of the 254 cases of papillary cystadenoma; in 22 (30.55 per cent) of the 72 cases of carcinomatous cystadenoma, and in 25 (32.46 per cent) of the 77 cases of solid adenocarcinoma. The high incidence of pain among the 403 cases (52.6 per cent) is of interest in view of the prevailing impression that carcinoma is in general painless. Intraabdominal tumor, however, may produce pain from general intraabdominal pressure, peritoneal irritation, interference with blood supply, or pressure on other organs and the sequellae of this. That the pain in the disease is variable in degree and character is indicated by the diversity of terms used in describing it, such as "drawing," "throbbing," "dragging," "distressing but not severe," "dull ache," "bearing down," "burning," "darting," "sharp," "tearing," "colicky," "soreness," "twinges of pain," and "intermittent intense pain." Backache was not an outstanding feature; it was mentioned by only 33 (8.18 per cent) of the entire group of patients.

## MORTALITY AND LENGTH OF LIFE

Of the 403 patients, 388 have been traced, and of these, 232 (59.79 per cent) were living at the time the study was made, three years or more after operation, and 156 (40.20 per cent) were dead. The proportion of deaths was much lower among the patients who had papillary cystadenoma than among those who had carcinomatous cystadenoma or solid adenocarcinoma. Sixty-three or 27.27 per cent of the 231 traced patients with papillary cystadenomas, 40 or 55.55 per cent of the 72 traced patients with carcinomatous cystadenoma, and 53 or 62.35 per cent of 85 traced patients with solid adenocarcinoma were dead.

The duration of life since operation, of those whom follow-up investigations had revealed to be living at the time the data were assembled, was as follows: 168 of those who had papillary cystadenoma were living, of whom 6 (3.57 per cent) had lived three years; 97 (57.73 per cent), five years, and 65 (38.68 per cent), ten years. Thirty-two of those with carcinomatous cystadenoma were living, of whom four (12.5 per cent), had lived three years; 9 (28.12 per cent), five years, and 19 (59.37 per cent), ten years. Also 32 of those with solid adenocarcinoma were living, of whom 2 (6.25 per cent) had lived three years; 6 (18.75 per cent), five years, and 24 (75 per cent), ten years.

Twenty-seven of the 156 patients (17.30 per cent) died later than three years after operation; 8, later than seven years after operation, and one in the fifteenth year after operation. All the patients died of abdominal recurrence or of distant metastasis. The 14 patients who died within thirty days have not been considered further in the analysis of end-results.

## MORTALITY AND LENGTH OF LIFE IN RELATION TO UNILATERALITY AND BILATERALITY OF INVOLVEMENT

It is well known that carcinomatous involvement may occur in both ovaries, as primary lesions in both, or one as a metastatic lesion from the other. It was of interest, therefore, to determine the incidence of bilaterality and to compare the mortality and length of life of those patients who had unilateral with those who had bilateral malignant growths. In the cases considered for analysis, there was not any evidence of metastasis. There were remaining 274 cases: 206 cases of unilateral, and 68 cases of bilateral tumor. Of the 206 patients with unilateral tumor, 37 (17.96 per cent) had died when this study was made, whereas of the 68 with bilateral tumors, 30 (44.11 per cent) had died.

Therefore, in the 274 cases selected for study of unilateral and bilateral involvement, 68 (24.81 per cent) of the neoplasms were bilateral, and of all those who had bilateral tumors a much larger proportion (44.11 per cent) had died than of all those who had unilateral

tumor (17.96 per cent). Here again the relatively small proportion of deaths among those who had papillary cystadenoma is conspicuous.

Furthermore deaths in one and two years were in smaller proportion (50.05 per cent) among the 37 patients who had unilateral tumor than among the 30 (76.66 per cent) who had bilateral tumor. Therefore, death of patients with bilateral involvement occurred earlier.

#### RECURRENCE IN THE REMAINING OVARY AFTER UNILATERAL OOPHORECTOMY

In view of the known tendency of these tumors to develop independently in both ovaries or to metastasize, after unilateral oophorectomy, to the remaining ovary, the incidence of recurrence of the disease, in cases in which only one ovary was removed at operation, was determined. There were 72 patients with initially unilateral involvement, from whom only a single ovary was removed, and of these, 16 (22.22 per cent) later died of the malignant disease. Five died within one year after operation; one, within two years; 2, within three years; 4, within four years; one, within five years; one, within six years; one, within seven years; and one within more than nine but less than ten years.

Of the recurring growths in these cases, 7 were papillary cystadenomas; 4, carcinomatous cystadenomas, and 5, solid adenocarcinomas. On the other hand, the incidence of recurrence among cases in which bilateral oophorectomy was performed was relatively almost as high as that among cases in which only one ovary was removed: among 67 cases in which bilateral oophorectomy was performed, there was recurrence in 14 (20.89 per cent). It would appear, therefore, that in this series the recurrence was the result of the malignant tendencies of the disease rather than of a too restricted surgical procedure. In general, however, it would seem wise to bear in mind the high incidence of bilateral involvement, as well as the high incidence of recurrence in the three types of ovarian adenocarcinoma under consideration. Nevertheless, preservation of the function of childbearing of the young patient, is a consideration. Of the 72 patients from whom only one ovary was removed, 12 (16.66 per cent) later became pregnant.

#### INTRACYSTIC AND EXTRACYSTIC GROWTHS

A malignant growth occurring within a cyst is thought, in general, to be less likely to recur than an extracystic growth. Therefore, cases in which there was no evidence of metastasis were chosen for study. In cases of intracystic tumor recurrence was less likely to develop than in cases of extracystic tumor. Nevertheless, the proportion of cases of intracystic tumor, in which there was recurrence, was somewhat higher (11.53 per cent) than was anticipated. There were 6 patients with ruptured cysts; 2 died and 4 lived. The data concerning these 6 patients are as follows: Two had papillary cystadenoma of whom one was living eighty months and one 111 months after operation; two had carcin-

omatous cystadenoma, of whom one was living sixty-one months, and one died forty-eight months after operation; two had solid adenocarcinoma occurring in a cyst, of whom one was living eighty months, and one died within five months after operation.

#### PSEUDOMUCINOUS CARCINOMATOUS CYSTADENOMA

Although pseudomucinous cystadenomas are usually classified as benign tumors, some of them contain definitely carcinomatous cells. Twenty-one such cases were included in this entire series. Of the 8 patients who had unruptured cysts of this type, 7 are living and one is dead. Of the 13 patients who had ruptured cysts with peritoneal involvement, 6 (46.15 per cent) are living and 7 (53.84 per cent) are dead. The length of life of those who died was as follows: 3 lived one year; one, two years; 2, four years; one, five years; and one, seven years.

This group of cases is of especial interest because, in spite of the low grade of malignancy from a pathologic standpoint, the ruptured growth tends to recur through implantation, and yields a relatively high mortality rate.

#### MALIGNANCY WITH ASCITES

Seventy-nine patients had ascites. Of these 79, 34 (43.03 per cent) were living and 45 (56.96 per cent) were dead at the time of the study. Therefore it is apparent that although the presence of ascites in general connotes an extension of the disease beyond the local lesion, and the mortality rate therefore is above the total average mortality rate (56.96 per cent as compared with 40.20 per cent) the rate when ascites is present is considerably lower than that when metastasis, without regard for the presence or absence of ascites, is present (56.96 as against 69.60 per cent). In those cases in which ascites was present without metastasis, the chance of survival would appear considerably improved over that in all cases of ascites, for the proportion of those surviving from three to ten or more years in the former group was 58.13 per cent, whereas, the proportion of those surviving from three to ten years in the latter group was only 43.03 per cent. The contrary is the case, however, when metastasis is evident, for the percentage of surviving patients dropped from 58.13 of those who had ascites without metastasis to 25 per cent of those who had ascites with metastasis whereas the mortality rate in the same respective groups increased from 41.86 per cent to 75 per cent. The significance of ascites would appear therefore to depend on the presence or absence of metastasis.

Of the cases in which there were ascites and metastasis, surgical operation was supplemented by roentgen therapy in all except 12. Of those patients who were not given roentgen therapy, 2 were living and 10 were dead at the time these data were gathered. From 1 to 10 courses of roentgen rays were given in each case in which they were applied; that is, an average of 2.5 courses was given to each patient.

PRESENCE OR ABSENCE OF METASTASIS IN RELATION TO MORTALITY  
AND LENGTH OF LIFE

A study was made of the mortality in the group of cases in which metastatic growths in the pelvis or abdomen were found at operation. There were 102 such cases; 48 of papillary cystadenoma, 17 of carcinomatous cystadenoma, and 37 of solid adenocarcinoma. Of these, 31 (30.39 per cent) were living and 71 (69.60 per cent) were dead at the time the study was made. Forty-nine patients had pelvic metastasis only. Of these, 19 (38.77 per cent) were living and 30 (61.22 per cent) were dead at the time the study was made. There were 53 cases in which there were abdominal as well as pelvic metastatic growths. Of these, 12 (22.64 per cent) were living and 41 (77.35 per cent) were dead at the time the material was gathered.

It may be readily observed that in this group of cases in which there was metastasis, again the papillary growths exhibited less malignant tendencies than either of the other two types. The chance of survival in cases of papillary cystadenoma with metastasis would appear from this study to be almost 1 to 1, whereas in cases of carcinomatous cystadenoma and solid adenocarcinoma the chance of survival with metastasis drops to 1 to 4, or less. However, even among the patients with growths of more malignant type, and who had pelvic and abdominal metastasis, 8 lived five years or longer, 5 of whom lived more than ten years. However, considering those who had both pelvic and abdominal metastasis, and those who had pelvic metastasis only, including all three types of malignancy, it should be noted that recurrence and death may occur after five or even ten years, as witnessed by the 7 cases in the series.

## SUMMARY AND CONCLUSIONS

The incidence by age of adenocarcinoma of the ovary is highest in the fifth or sixth decades of life. The average of the patients with papillary cystadenoma was forty-six and nine-tenths years; of those with carcinomatous cystadenoma, forty-six and seventy-three-hundredths years; and of those with solid adenocarcinoma, forty-eight and thirteen-hundredths years.

There are no characteristic symptoms of adenocarcinoma of the ovaries. Abnormality of ovarian function was apparent through disturbance of menstruation. Recent change in periodicity of the flow was present in 24.52 per cent of the cases; profuse flow (hypermenorrhea) was present in 28.94 per cent of the cases; scant flow (oligomenorrhea) was present in 24.12 per cent of the cases and metrorrhagia or bloody vaginal discharge was present in 19.6 per cent of the cases. Pain was an outstanding symptom in 52.6 per cent of the cases.

Length of life after operation and mortality for the series of 388 traced patients was as follows: 59.79 per cent were living and 40.20



per cent were dead at the time the study was made, three years or more after operation. The proportion dead at the time the study was made was lower among patients who had papillary cystadenoma (27.27 per cent) than among those who had carcinomatous cystadenoma (55.55 per cent) or solid adenocarcinoma (62.35 per cent).

Bilaterality was present in 24.81 per cent of the tumors without metastasis. A larger proportion of patients who had bilateral growths (44.11 per cent) was dead than of those who had unilateral growths (17.96 per cent). Length of life after operation tended to be shorter among those who had bilateral growths.

The proportion of deaths among those who underwent removal of only one ovary was 22.22 per cent and of those who underwent removal of both ovaries was 20.89 per cent. This is not a significant difference.

Intracystic malignancy was proportionately less likely to recur than extracystic malignancy. The percentage of deaths from recurrence of intracystic growths was 11.53 per cent as against 28.20 per cent from extracystic growths.

The proportion of deaths was high among cases of ruptured pseudomucinous cystadenoma with peritoneal involvement (53.84 per cent).

Of patients with ascites, 43.03 per cent were living and 56.96 per cent were dead at the time the study was made. The proportion of patients who were living was higher among those who had no apparent metastasis (58.13 per cent) than among those who had apparent metastasis (25 per cent).

Of patients who had metastasis, 30.39 per cent were living and 69.60 per cent were dead at the time the study was made. The proportion of patients who were living at the time the study was made was higher among those who had pelvic metastasis only (38.77 per cent) than among those who had both pelvic and abdominal metastasis (22.64 per cent).

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**Bohler, E.: The Use of Pernocton in the Treatment of Eclampsia, Bull. de la Soc. d'Obst. et de Gynéc. 5: 359, 1932.**

Bohler treated seven cases of eclampsia with pernocton and the results were highly satisfactory. In six cases convulsions ceased immediately. In contrast with this, the author mentions that among 47 eclamptic patients treated in his clinic by means of the Stroganoff routine convulsions ceased in only 19. Another advantage of pernocton is that it does not interfere with uterine contractions. A third factor in its favor is that venesection may be dispensed with. The blood pressure returned to normal in all of the seven cases.

J. P. GREENHILL.

## BLOOD SUGAR FINDINGS IN ECLAMPSIA AND PREECLAMPSIA\*

ISADORE A. SIEGEL, A.B., M.D., AND H. BOYD WYLIE, M.D.,  
BALTIMORE, MD.

(From the Department of Obstetrics and the Department of Biological Chemistry,  
University of Maryland Medical School)

### PART I. BLOOD SUGAR FINDINGS IN ECLAMPSIA

THE current evidence<sup>1, 2, 3, 4, 5, 6</sup> regarding blood sugar changes in eclampsia is not in agreement. Nor do the deductions from blood sugar findings agree except in that usually there is a rise in blood sugar after eclamptic convulsions.

This investigation was undertaken in an attempt to examine the claims of Titus and his coworkers<sup>1, 2, 4</sup> regarding blood sugar findings in eclampsia.

Accordingly, it was decided to repeat their work by following their procedure both as to the method of collection of blood and its analysis, and as to the avoidance of treatment of patients, while under examination, except for the occasional use of morphine.

#### LABORATORY PROCEDURES

*Preparation of Tubes for Collecting Blood Samples.*—Blood samples were received in test tubes, without lips, 150 by 18 mm., calibrated at 10 c.c., cleaned, rinsed with distilled water, and dried without sterilization. The anticoagulant-preservative mixture, sodium flouride, C.P., powdered (J. T. Baker), 10 parts and thymol, crystals (Merck, Reagent), 1 part, was prepared and used according to Sander.<sup>7</sup>

*Blood Sugar Determinations.*—One of us (H. B. W.) made every reported blood sugar determination in ignorance of the source and sequence of blood samples.

The procedure of Folin-Wu<sup>8</sup> was followed, modified by using 0.25 per cent aqueous solution of benzoic acid<sup>9</sup> in preparing stock and diluted glucose standards and, by substituting the modification of Haden<sup>10</sup> in the preparation of protein-free filtrates.

*Accuracy of Blood Sugar Determinations.*—All blood filtrates after Nov. 24, 1931, were examined in duplicate, that is, two 2 c.c. samples were removed from each protein-free filtrate, and were carried through to completion as two separate samples by one individual. Duplicates were read against appropriate standards in groups of four or five pairs, calculated in milligrams and averaged.

The maximum acceptable difference between duplicate determinations on one filtrate sample was limited to 6 mg.; the average of differences between all duplicate determinations was 1.34 mg. for 156 pairs of duplicates.

Errors shown to exist by Rothberg and Evans<sup>11</sup> were not corrected because it was necessary to be consistent in procedure with a technic,<sup>1, 2, 4</sup> the description of which includes no mention of any such corrections.

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Stander and Harrison,<sup>3</sup> after noting that "Colorimetric readings are notoriously subject to individual variations depending on the person taking the reading, . . ." state that ". . . readings of each individual were checked to within 0.5 of a scale unit." They continue: "We feel that as we have taken this unusual precaution our results should be regarded as accurate as can be obtained by the methods available at present."

On the assumption that by "0.5 of a scale unit" is meant 0.5 of a mm., exception is taken to this method of checking accuracy of results.

The adoption of such a standard of accuracy was purposely avoided in this work, because it was recognized that it introduces a variable error, in the final calculation in milligrams, which increases as the millimeter readings approach zero. This error becomes so large that it cannot be ignored in those readings that fall in the lower millimeter scale, that is, in those readings that indicate high blood sugar values.

No question is implied regarding the accuracy of the blood sugar findings of Stander and Harrison,<sup>3</sup> because all their readings, even at low millimeter levels, may have come well within the limits of 0.5 of a scale unit, that is, within 0.5 of a millimeter. However, the error that may arise from the adoption of a colorimeter scale unit as large as 0.5 mm. as a standard for judging accuracy in plunger-type colorimeter readings is obvious, and is shown in Table I.

TABLE I. BLOOD SUGAR

THIS TABLE SHOWS THE ERRORS IN MILLIGRAMS OF BLOOD SUGAR INTRODUCED, AT DIFFERENT MILLIMETER LEVELS, BY A DIFFERENCE OF 0.5 MM. IN COLORIMETER READINGS

COLORIMETER READINGS IN MM.	MG. 100 C.C.	ERRORS IN MG.
7.0	286	+20
7.5	266	
8.0	250	-16
9.5	210	+10
10.0	200	
10.5	190	-10
19.5	102.5	+2.5
20.0	100.0	
20.5	97.5	-2.5
29.5	67.7	+1.1
30.0	66.6	
30.5	65.5	-1.1

In proposing a method for delimiting errors in colorimetric blood sugar determinations, it is suggested that duplicate examinations be made from single filtrate samples and that the standard for checking consistency of results be one of milligrams rather than of millimeters. In this way technical errors are checked by duplicate examinations and a limit of allowable error is established by a milligram standard that remains fixed for all millimeter readings.

#### BLOOD SUGAR FINDINGS IN ECLAMPSIA

This study was begun in August, 1931. It includes the findings in seven cases of eclampsia as follows:

Case 1 (Chart 1) represents a patient who had 5 convulsions before admission to the hospital. This case shows fluctuations of blood sugar: a drop preced-

ing and a rise following each convulsion, the blood sugar remaining within the lower hyperglycemic levels, that is, between 119 mg. and 137 mg.

Case 2 is unsatisfactory since only a few readings were recorded. The pre-eclamptic blood sugar readings were mostly in the lower limits of normal and the blood sugar immediately following the convulsion was just above normal limits, and then, hyperglycemic and fluctuating, after venesection.

Case 3 (Chart 2) also shows low normal blood sugar readings in the preeclamptic period. The patient then unexpectedly had 2 convulsions in rapid succession fol-

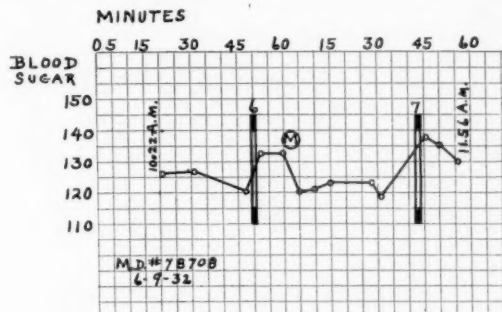


Chart 1.—Case 1, blood sugar curve in antepartum eclampsia. Case M.D. 78708 (6-9-32). M = morphine.

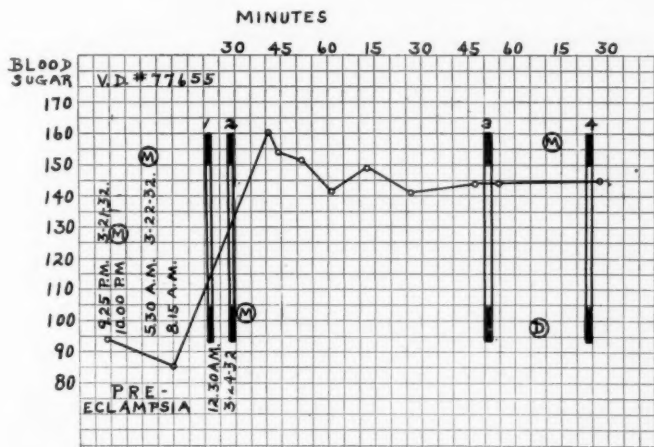


Chart 2.—Case 3, blood sugar curve in preeclampsia and intrapartum eclampsia. Case V.D. 77655 (3-21-32 to 3-24-32). M, morphine, D, delivered stillborn.

lowed by a marked rise to 160 mg. of blood sugar, which fluctuated, dropping to a level of 141 mg. to be followed by a third convulsion with only a slight rise to 143 mg. Delivery by low forceps was instituted at this point hence only one blood specimen was taken during this period. Hospital procedures prevented the taking of frequent blood specimens between the third and fourth convulsions. The blood sugar curve during this period, represented by the two samples taken, remained at the same level. The fallacy of drawing conclusions from infrequent specimens is illustrated by the curve during this period. This curve during the eclamptic period shows fluctuations in the blood sugar which all occur at hyperglycemic levels, at the same time showing a drop preceding the third convulsion.

Case 4 is the record of a patient who had 8 convulsions before admission to the hospital. She had an initial blood sugar of 198 mg. which fluctuated and fell to 161 mg. just before a ninth and last convulsion. This convulsion was followed by a rise to 187 mg. with slight fluctuations thereafter. This case showed fluctuations at hyperglycemic levels, a drop preceding and a rise following, the last convulsion.

Case 5 (Chart 3) is a record of a patient who had 5 convulsions before arrival at the hospital, and a sixth and a seventh convulsion soon thereafter. It was possible to collect only one specimen between these two convulsions. Avertin 60 mg. per kilo was given per rectum after which she had no further convulsions. She was delivered of a live baby the following day. Where frequent samples could be taken this case shows fluctuations and a fall in blood sugar before a convulsion, the blood sugar reaching lower levels soon after each convulsion.

Case 6 is that of a patient who had 3 convulsions before admission and a fourth on admission, with an initial blood sugar of 174 mg. which fluctuated,

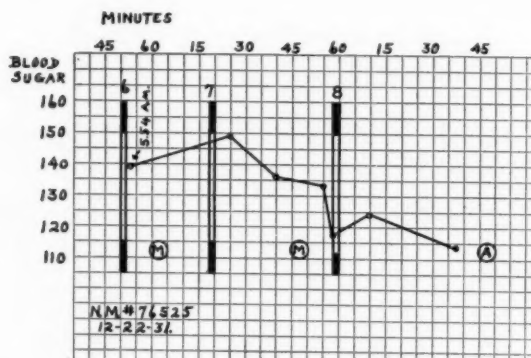


Chart 3.—Case 5, blood sugar curve in intrapartum eclampsia. Case N.M. 76525 (12-22-31). M, morphine, A, avertin, 60 mg. per kilo.

reaching the lowest level of 163 mg. preceding a fifth convulsion, following which the blood sugar rose to 175 mg. and gradually fell to 139 mg. Clinically the patient seemed to be improved and no further readings were taken, but one hour later she had a sixth and last convulsion. The patient showed a fall in blood sugar before, and a rise after, a convulsion, with a tendency to reach lower levels after each convulsion. All blood sugar findings were within hyperglycemic limits.

Case 7 is the record of a patient who was admitted to the hospital in labor as a normal case with a blood pressure of 126/85 at which time she was given morphine grains  $\frac{1}{4}$  to induce rest. She was delivered three hours and twenty-five minutes later. It was noticed that the patient was drowsy but this was thought to be due to the morphine. Unexpectedly six hours after delivery she had a convulsion and was in coma. Her blood pressure was 126/80 and slowly rose to higher levels. Fifteen minutes after this convulsion she showed an initial blood sugar of 115 mg. which gradually fell to 94 mg. The patient had no further convulsions and recovered. This patient had a normal, rather than hyperglycemic, blood sugar curve.



## SUMMARY OF FINDINGS IN ECLAMPSIA

These findings show (1) that fluctuations occur in the blood sugar in eclampsia; (2) that there is an increasing tendency toward the establishment of lower blood sugar levels after each convulsion; (3) that generally a fall in the blood sugar occurs preceding each convulsion and (4) that the majority of cases presented here show hyperglycemic rather than normal or hypoglycemic values.

This investigation confirms the fact that in order to find these changes, blood specimens must be taken at five, ten, or fifteen minute intervals during the course of the study.

## PART II. BLOOD SUGAR FINDINGS IN PREECLAMPSIA

In the course of this work there were studied 19 cases of preeclampsia. From most patients the blood sugar specimens were taken at the time of admission to the hospital and then daily following an overnight fast.

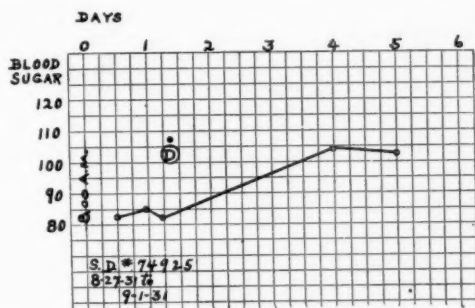


Chart 4.—Blood sugar curve in preeclampsia. Case S.D. 74925 (8-27-31 to 9-1-31). *D*, delivery by cesarean section at 4:00 P.M. on the second day. Blood pressure, 8-27-31, 178/120; 9-13-31, 118/74.

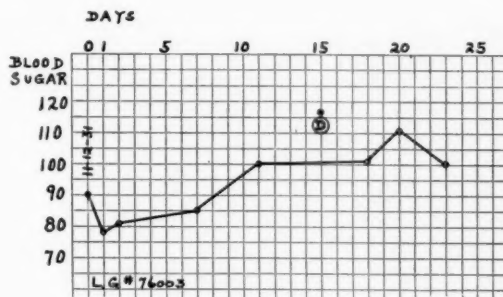


Chart 5.—Blood sugar curve in preeclampsia. Case L.G. 76003 (11-12-31). *D*, spontaneous delivery. Blood pressure, 11-12-31, 155/118; 12-9-31, 130/88.

Frequent specimens were not taken from these cases as from the eclamptic patients, otherwise the blood samples were collected and examined by the same methods as used for eclamptic specimens.

TABLE II. BLOOD SUGAR READINGS IN PREECLAMPSIA

	CASE NUMBER	CHART NO.	BEFORE DELIVERY			AFTER DELIVERY		
			BELOW 80 MG.	BETWEEN 80-110 MG.	ABOVE 110 MG.	BELOW 80 MG.	BETWEEN 80-110 MG.	ABOVE 110 MG.
Group I	75610	—		81, 84, 86, 96			Eclampsia	
	77655	—		94, 85			Eclampsia	
	78344	—	79, 78	89, 85, 95, 91			102, 94	
	78375	—	72	97, 82			82, 86, 94, 93	
	78316	—	69, 71, 66				102, 75, 94, 82	
	75427	—	77	85, 88, 82			101	
	78166	—		84			97, 84, 91	116
	74925	4		83, 85, 83				114, 113
	75079	—	66	81		79		
	78023	—				74		
	76003	5	77	90, 82, 85, 100			103	
	77949	—	72, 77	80, 87, 84			84, 91	
	78115	—		84			101, 100	111
Group II	75830	—	65				82, 85	
	77624	—		93, 85, 101			98, 101	113
	76471	6	73	89, 82			90	
Group III	76224	—	75, 68				Not delivered	
			70, 60, 69				Not delivered	
	74759	7		98, 81, 102			83	
	76313	8			147, 130		89, 92, 108	

Titus and coworkers<sup>4</sup> state: "work now under way in this clinic but still incomplete indicates that hypoglycemia is much more pronounced and is an even more constant feature of preeclampsia, than it is after the sugar values have been disturbed by convulsions."

This study now presents conclusive evidence of the great frequency and preponderance of low normal or subnormal blood sugar levels in preeclampsia.

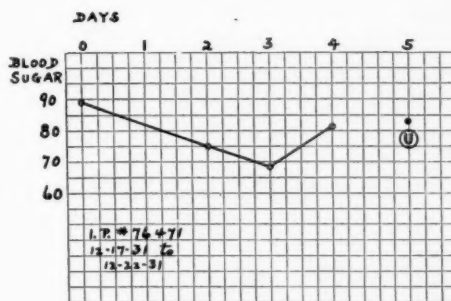


Chart 6.—Blood sugar curve in preeclampsia. Case I.P. 76471 (12-17-31 to 12-22-31). U, discharged undelivered. Blood pressure, 12-17-31, 190/114; 12-22-31, 130/80.

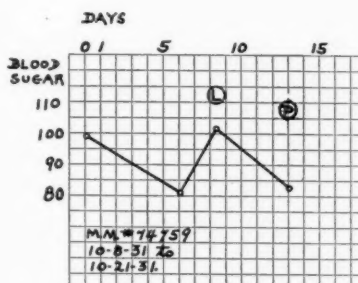


Chart 7.

Chart 7.—Blood sugar curve in preeclampsia. Case M.M. 74759 (10-8-31 to 10-21-31). L, in labor, P, postpartum. Blood pressure, 10-8-31, 150/100; 10-26-31, 138/88.

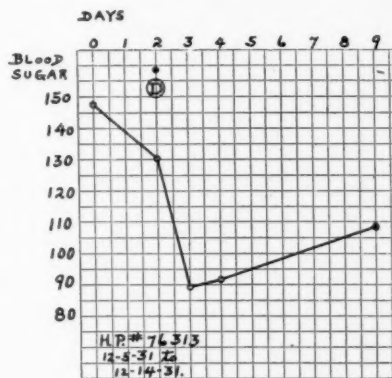


Chart 8.

Chart 8.—Blood sugar curve in preeclampsia. Case H.P. 76313 (12-5-31 to 12-14-31). D, delivered. Blood pressure, 12-5-31, 150/100; 12-16-31, 122/88.

Cases 2 and 3 reported in Part I represent the 2 cases of preeclampsia which developed eclampsia. In both of these cases the readings preceding the first convulsion were in the region of low normal and only after the convulsion did the blood sugar rise and show wide fluctuations.

Charts 4 and 5 are representative of the blood sugar curves of 11 of the cases of preeclampsia (Group I, Table II) which before delivery were all in the region of low normal with many readings subnormal, that is, below 80 mg. per 100 c.c. of blood, while after delivery the blood sugar readings assumed more normal levels in most cases. Blood specimens were taken before and after the patients were delivered.

Chart 6 is representative of blood sugar curves of 3 cases (Group II, Table II) that improved under treatment. They were discharged from the hospital undelivered. This chart shows low readings with the tendency to assume more normal levels as the patient improved.

Chart 7 (Group III, Table II) is atypical in that it shows normal readings but at the same time these readings are not at a constant level. It is difficult to draw any conclusions from it except that possibly it is an indication of an unstable carbohydrate mechanism that may exist in this disease.

Chart 8 (Group III, Table II) is another atypical blood sugar curve in that the patient before delivery had a mild hyperglycemia which changed after delivery to normal blood sugar levels. Here again the findings are suggestive of an unstable carbohydrate mechanism in preeclampsia with a readjustment after delivery.

In Table II are listed all the blood sugar readings found in 19 preeclampsia cases. The normal variation for the Folin-Wu method is generally accepted as from 90 to 120 mg. per 100 c.c. of blood. In this study a range of from 80 to 110 mg. was taken as the normal variation. This table shows the preponderance of subnormal or low blood sugar levels in preeclamptic cases before delivery; whereas, after delivery the great majority of readings lie within the normal average figures. Hyperglycemia is relatively infrequent in preeclampsia.

#### GENERAL CONCLUSIONS

1. There is some disturbance in carbohydrate metabolism in eclampsia and preeclampsia as evidenced by the changes in percentage of blood sugar.
2. Fluctuations in blood sugar occur in eclampsia.
3. Eclamptic convulsions are generally preceded by a fall in blood sugar, which is often one of "relative hypoglycemia."
4. Usually there is a temporary rise in blood sugar following a convulsion.
5. After each succeeding convulsion there is an increasing tendency toward the establishment of lower blood sugar levels.
6. Hyperglycemia occurred in the majority of eclamptic patients studied in this series, although normal and hypoglycemic values were found.
7. In preeclampsia low normal or subnormal blood sugar is characteristic; as the patient improves under treatment or by delivery the blood sugar assumes more normal levels.
8. In the two cases of preeclampsia as represented by Charts 7 and 8, the atypical blood sugar findings suggest an unstable carbohydrate metabolism.
9. Proof is offered that colorimetric readings checked to within 0.5 mm. are subject to error.

The authors wish to express thanks to Ruth C. Vanden Bosche for the careful preparation of tubes for the collection of blood samples.

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## AUTOTRANSPLANTATION OF PLACENTA TO THE ANTERIOR CHAMBER OF THE EYE AND ITS EFFECT ON LACTATION\*

SOL LITT, S.B., M.D., CHICAGO, ILLINOIS

(From the Department of Obstetrics and Gynecology of the College of Medicine,  
University of Illinois)

THE literature is lacking in reports of transplantation of placental tissue to the anterior chamber of the eye. Frankl<sup>1</sup> has transplanted whole placentas to the subcutaneous tissue in mice, and has obtained successful transplants. He found the transplants grew for a period of three to four weeks, after which they degenerated and were absorbed. Neuweiler<sup>2</sup> grew human placental tissue in various culture media and determined that the stroma grew most vigorously, the Langhans cells grew well but he was not convinced that the syncytium partook in the growth.

Transplantation of other tissues to the anterior chamber of the eye was done by Schochet,<sup>3</sup> who utilized homoplastic transplants of ovary, and observed them to persist for eight weeks. Allen and Bauer<sup>4</sup> made endometrial transplants to the anterior chamber of the eye in rabbits, obtaining a successful implantation in 44 out of 50 eyes implanted. Their transplants continued viable for fourteen months. Schochet<sup>5</sup> later produced experimental endometriosis by the transplantation of sensitized endometrium to the anterior chamber of the eye in guinea pigs. He utilized transplants treated by various agents to further proliferative changes, as his untreated transplants showed no proliferative growth other than cyst formation in a few cases. The transplants in his series remain viable for three to seven months after transplantation to the anterior chamber. Allen<sup>6</sup> studied the proliferation of endometrium transplanted to the anterior chamber of the eye in rabbits and found uterine epithelium to proliferate more readily than did other implanted substances. His implants were removed at intervals of time up to thirteen months.

Contradictory reports have appeared in the literature concerning the effect of the placenta upon the secretion of milk. Frankl in his transplantation experiments found that those pregnant mice in which a successful placental transplant had been made gave birth to litters all of which died because of the persistence of colostrum,

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and the absence of true milk from the mammary glands of the mother. Frankl concluded, therefore, that the placenta prepares the breast for secretory function, but inhibits the actual secretion of true milk. Stimson<sup>7</sup> showed that retained placenta in the human being may inhibit or delay milk secretion, and that if the retained placental tissue is removed, the milk secretion quickly develops to the normal level. Cornell,<sup>8</sup> however, has used prepared placental tissue of cows by mouth as a galactagogue, and believes that it has a favorable effect in the production of milk. Hammet,<sup>9</sup> studying the functions of the internal secretion of the placenta states that although there is no apparent stimulation leading to an increased supply of milk there was exerted upon the secretory function of the mammary gland an influence tending to raise the level of protein and lactose production with a decrease in fat metabolism.

The present study of autotransplantation of placental tissue to the anterior chamber of the eye was undertaken with several points in mind; first, to determine whether or not placental tissue will grow in the anterior chamber of the rabbit's eye; second, to observe the rate and details of the growth macroscopically and microscopically; and third, to determine whether or not the amount of transplanted and growing placental tissue has an effect upon the secretion of milk from the mammary glands of the host.

*Methods and Technic.*—In this series, 22 autotransplants of placenta to anterior chamber of the eye were made in 15 pregnant rabbits. The rabbits used were in various stages of gestation, although effort was made to obtain those pregnant from five to twenty days. After shaving the abdomen and cleansing with iodine and alcohol, anesthesia was induced by ether, care being taken to obtain light anesthesia. A midline abdominal incision was made, and one horn of the pregnant uterus identified. One fetus with placenta was delivered through a hysterotomy incision. The placenta was immediately placed in warm physiologic saline solution while the uterine incision and peritoneum were closed. The eye into which the implant was to be made was cleansed by a drop of 1 per cent mereurochrome, and a stab incision made through the conjunctiva and cornea into the anterior chamber. One or more pieces of placenta about 2 mm. square were cut from the fresh specimen, including the entire thickness of the placenta. Several such pieces could be utilized in most instances. These were slipped into the anterior chamber of the eye by means of fine forceps, usually without difficulty. The eyelids were not closed by suture, although in some cases they were clamped closed for a few minutes. The abdominal wall was then closed in layers with fine catgut suture and the skin closed with black silk continuous suture. This method of implantation closely follows that of Allen and Bauer, and was found simple and effective. The implants were easily inserted and extrusion was noted in only two cases, and in these cases was not complete. In 2 cases the implantation was unskillfully performed and vitreous humor was seen to escape after the stab incision into the anterior chamber was made. These cases were not considered in the subsequent study.

The animals were returned to their cages immediately after operation and were observed daily. Early in the study morphine was used to quiet the rabbits and to prevent abortion, but this was later deemed unnecessary as the tendency to abortion seemed slight. No animals aborted immediately after operation, the earliest delivery of a litter being five days after transplantation was done. Two litters were not born until twenty-two days after the operation, the average time of delivery being sixteen days after transplantation.

When the eyes were desired for microscopic study the animals were killed with ether and the eyes immediately enucleated. The bulbs were fixed in Mueller's solution, blocked in celloidin, sectioned, and stained with hematoxylin and eosin. In order to obtain a series of histologic preparations, eyes were removed at various periods after transplantation. Eyes were removed four days, thirteen days, and thirty days after operation respectively, and others still later. Three transplants were still visible twenty-six months after implantation, and were removed for microscopic study.

For the purpose of determining the effect of the transplantation upon lactation, it was necessary first, to ascertain whether or not the mammary glands of the implanted animals elaborated milk as do normal glands, and second, to determine whether or not milk, if formed, was obtained by the young in the normal manner. To determine the power of the glands to elaborate milk, several implanted animals which had given birth to litters were examined. The mammary glands were dissected out and opened and their contents subjected to macroscopic and microscopic examination, and compared with normal controls. To observe whether the young of the implanted animals obtained milk as did normal controls, the stomachs of several of the young were opened immediately after they had been observed to suckle. The stomach contents were then compared macroscopically and microscopically with contents obtained in an identical manner from the young of nonimplanted rabbits used as controls.

*Results.*—Of 22 autotransplantations considered, there were 20 successful "takes" and 2 which were considered macroscopically as unsuccessful. In the case of the successful implants there was uniformly noted a marked clouding of the anterior chamber about twenty-four hours after implantation. This clouding persisted for a variable period of time, usually for several days, and was often accompanied by a secretion of white flocculent material upon the conjunctival surface. Four to six days after operation there could be noted development of small blood vessels from the limbus or iris which entered into the transplant, and at this time hyperemia of the conjunctiva was noted. The secretion became less and disappeared in the majority of cases, although in 3 cases repeated irrigation with 10 per cent neosylvol was necessary. From this stage on in the successful cases, the implants increased in size and their vascularization became more noticeable. Such implants remained grossly viable as long as forty-eight days after transplantation. Transplantations which were to be unsuccessful showed slight cloudiness of the anterior chamber within twenty-four hours, but both clouding of the chamber and secretion on the conjunctival surface were less marked than in the successful cases. Vascularization of the implants was not noted in the unsuccessful cases and within four to five days the implants had diminished in size and were noted only as small white patches or flecks within the anterior chamber. After ten days they were visible only as hazy masses and remained as such for variable periods of time, after which they disappeared almost entirely. Total disappearance, however, was not noted, and an implanted eye could always be recognized by a haziness within the anterior chamber and the clouded scar of incision in the conjunctiva and cornea. Increasing intraocular pressure was not a prominent feature in this series, although in a few instances difficulty in placing the implants was experienced, due to fluid pressure within the anterior chamber.

In interpreting the microscopic sections of the implanted placenta, it must be remembered that branching villi protruding finger-like into maternal blood sinuses do not exist in the placental structure of the rabbit. Chipman<sup>19</sup> has shown that the rabbit placenta is formed of two portions, fetal and maternal. The fetal portion consists of trophoblastic tissue in the form of tubules, each tubule separated from its fellow by a connective tissue septum. In the axis of each tubule is a channel filled with maternal blood coming from the maternal sinuses which are situated in the maternal portion of the placenta. The tubules are closely set upon the maternal portion in such a fashion that the "mouths" of the tubules rest upon it. This maternal portion is composed of large decidual cells rather closely packed and sometimes markedly vacuolated.

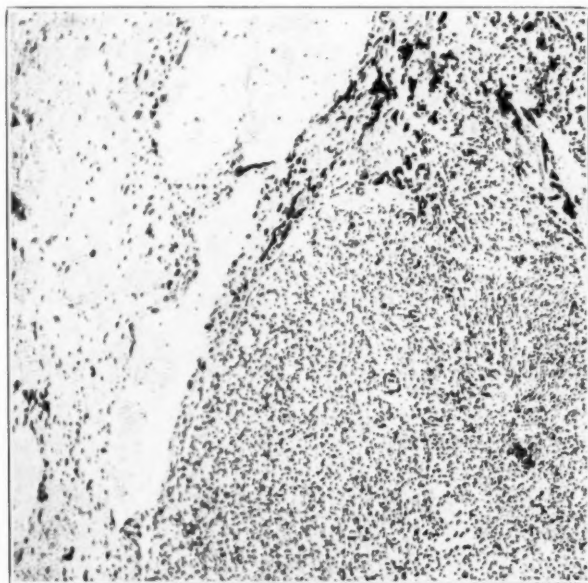


Fig. 1.—Normal rabbit placenta near full term. To right, fetal placenta (trophoblast); to left, maternal placenta (decidua), with large blood spaces.

The maternal sinuses are situated deeper in the uterine tissue. Separation of the placenta takes place normally in the deeper layer of the decidua, where a zone of degenerated decidua can be observed as the placenta nears maturity.

In the implants, therefore, we may expect to see trophoblastic masses of the fetal portion, or the decidual cells of the maternal portion, or both of these elements, depending upon which elements survive the transplantation better, or which grow more vigorously after transplantation.

It should further be noted that the physiologic life of the placenta in the rabbit is from twenty-six to twenty-eight days. It is natural, therefore, to expect that the life of implanted placental tissue would not

greatly exceed this period of time unless the implanted tissue should assume the characteristics of a malignant growth, and show evidence of this malignancy on histologic examination.

*Microscopic Results.—Four days after implantation No. 80:* The section showed a moderate sized implant lodged partly within the cornea and partly penetrating into the anterior chamber. The implant was broken up in places, had degenerated somewhat, and was infiltrated with polymorphonuclear leucocytes. In one place the end of the iris was involved in the implant, being pinched between two portions of it and drawn up into the corneal incision. The structure of the implant showed it to be made almost entirely of fetal placenta (trophoblast). The edges of the implant stained faintly and appeared necrotic in places, but were well demarcated and showed no evidence of a malignant type of invasion. There were many small blood vessels in the iris adjacent to the implant and some could be seen in the implant proper.

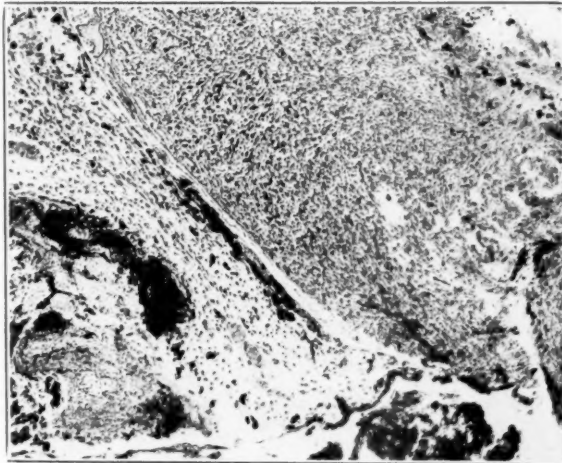


Fig. 2.—Placental implant four days after implantation, showing fetal placenta lodged next to iris. Slight necrosis of implant at edges.

*Thirteen days after implantation No. 180:* The section showed a break in the cornea through which a large implant had grown, filling the anterior chamber and attaching itself to the iris on one side. At this point it had grown into the iris to a considerable extent, scattering the iris pigment widely throughout the section. The implant had undergone some degenerative changes and was markedly infiltrated with blood in places but in other places showed the structure of fetal placenta (trophoblast). The implant rested upon the anterior surface of the lens and had in no place broken through, although it had extended anterior to the iris and filled almost the entire anterior chamber. The iris to which the implant had attached itself showed many dilated blood vessels, although none could be seen in the implant proper.

*Thirty days after implantation No. 80:* The section showed a small portion of the implant lodged in a cleft in the cornea at the point of incision. This implant was well preserved and was entirely made up of fetal placenta (trophoblast). Deep in the anterior chamber, and extending behind the iris lying directly upon the anterior surface of the lens was a large implant, made up entirely of trophoblast with a moderate polymorphonuclear infiltration scattered throughout it. The implant

was well demarcated and at no place broke through the anterior surface of the lens. It had attached itself only slightly to the iris and did not invade the iris. There was considerable free blood within the trophoblastic tissue.

*Forty-eight days after implantation No. 110:* The section showed a large implant adherent anteriorly to the posterior corneal surface, involving one portion of the iris anteriorly, and extending well into the anterior chamber. The entire implant stained faintly, did not show cellular structure, and was thickly infiltrated with leucocytes. In its deeper portions, the implant stained very faintly and homogeneously, and there were areas where the stain was not taken at all. The entire picture was one of necrosis of the implant and infiltration with leucocytes.

*Five months after implantation No. 2A-40:* This section showed the anterior chamber to be entirely empty, there being no evidence of implant. The iris was somewhat shrunken and shortened on both sides and the cornea showed on its outer surface an area of proliferating cells which might be considered the scar of implantation, but there was no further evidence of the implant.

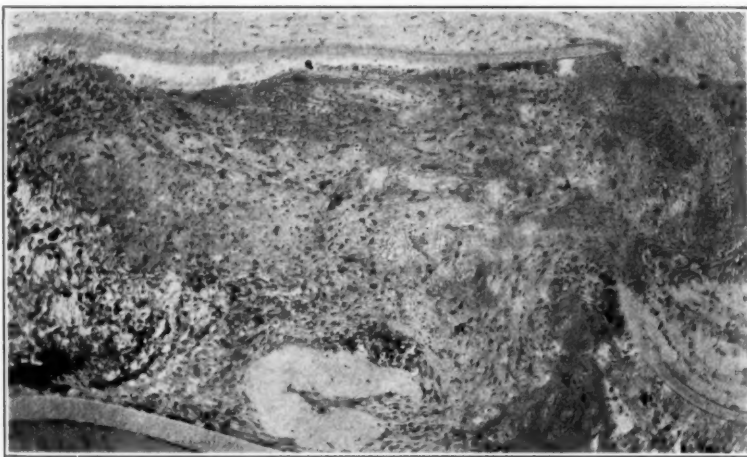


Fig. 3.—Implant thirteen days after transplantation. Cornea above, anterior lens below. Scattered fetal placenta growing into iris at left, scattering iris pigment. Moderate necrosis throughout implant with blood infiltration. Dilated blood vessels in iris (left).

It was thus noted that the implants grew actively from shortly after implantation to thirty days after implantation. The eye removed forty-eight days after implantation showed necrosis and evidence of death of the implant. Those implants which were allowed to remain for longer periods all showed, when removed, varying degrees of necrosis and evident removal from the anterior chamber, so that, in the case of implants allowed to remain in situ for many months, there was no remaining placental tissue visible when the eyes were microscopically examined.

In 5 cases, the breasts of implanted animals were dissected out and opened. This was done from five to seven days after the birth of a litter in every case. In all cases the abundant amount of white fluid obtained from the breasts was compared microscopically with normal rabbit milk and found to be identical in every respect.



In 5 cases the stomach contents of the young of implanted mothers was examined immediately after the young had been observed to suckle. The selected young were removed from the breast after having been allowed to suckle for several minutes, were immediately sacrificed by kill-



Fig. 4.—Thirty days after implantation. Large implant filling anterior chamber. Iris above implant. Fetal placenta only makes up the transplant. No evidence of invasive growth.

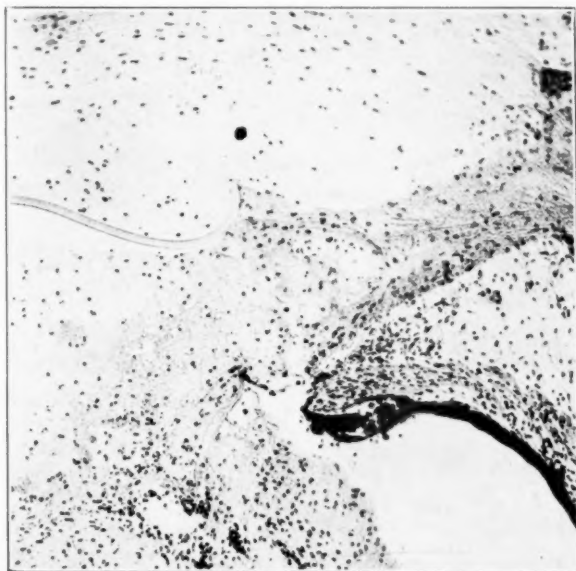


Fig. 5.—Forty-eight days after implantation. Entire implant necrotic without visible structure. Cornea above, iris to right.

ing with ether, and the stomach ligated at cardiac and pyloric ends and removed. The stomachs were then opened and the contents compared with stomach contents of normal young of unimplanted mothers. In all cases the milk found in the stomachs of the young of implanted mothers was identical with that of the control young.

*Conclusions.*—The following conclusions seem justifiable from this study:

1. Autotransplantation of placental tissue to the anterior chamber of the eye in rabbits is accomplished with a high percentage of success. The placental implants attach themselves to structures within the anterior chamber, usually the iris, and derive a blood supply sufficient for their maintenance from these structures. The implants grow readily for a period of approximately thirty days, after which gradual degeneration occurs. After death of the implants necrosis and absorption accounts for their entire removal from the anterior chamber.

2. Fetal placenta (trophoblast) alone takes part in the growth after transplantation. There is no evidence to show that the maternal elements (decidua) persist in the implants.

3. There is no observable tendency for the implanted placenta to undergo malignant change, or to exhibit any indication of invasive growth.

4. Amounts of placental tissue which may be transplanted to the anterior chamber have no effect upon the formation or secretion of milk in the host.

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185 NORTH WABASH AVENUE.

#### DISCUSSION

DR. EDWARD ALLEN.—Dr. Litt did not mention Markee's work. There is evidence of a definite cyclic change in the endometrium according to this author. I have transplanted tubes that also showed this cyclic change.

DR. EMIL RIES.—When we transplant skin from one human being to another human being however closely related, father to son, son to father, etc., it may take perfectly and last for a varying period of time. At the end of that time the grafted skin comes off in identical ratio to the new skin formed by the recipient under the graft. The patient's own skin grows in from the edges and dislodges the graft and it falls off as a thin pellicle. That surface may have been grafted with twenty pieces and yet the outline of those pieces is invisible. On the other hand, when you graft the skin of an individual from one area of his body to another, that grafted skin will stay there and is not supplanted. The patient's own skin will not grow under his own skin and, at the end of five years you can see the outline of each and every one of the grafted pieces as I have demonstrated repeatedly.

This has some bearing on placental tissue grafted into the eye of the mother. The fact that the placental tissue undergoes atrophy is evidence that it is tissue foreign to the mother. The reason why this placental tissue atrophies and is lost is that it is foreign, and conversely the observation shows to what extent the placenta is foreign to the mother.

DR. A. G. GABRIELIANZ.—I understand that several of the experimental animals in which transplantations were done were pregnant and that these rabbits aborted in sixteen days. Do you assume that these rabbits delivered at term or did they abort after transplantation of placenta?

DR. LITT (closing).—I am familiar with Markee's work but did not mention it because I thought it had no direct bearing on my work. In regard to the cyclic changes that were observed in his work, there was nothing in the way of cyclic or vascular changes observed in these placentas. I had not thought of implanting the placenta into the young because I was interested in the problem of the effect of implantation upon the secretion of milk in the host in the attempt to confirm Frankl's original work. It is certainly true that fetal placental tissue is foreign tissue to the mother and in that respect might grow for a longer period and more vigorously if implanted into the eye of the newborn animal.

There were no abortions after implantation. The earliest delivery of a litter was five days after implantation. This litter was full term and lived and, therefore, was not considered as an abortion. The other deliveries were from five to twenty-two days after implantation and the average of all deliveries was sixteen days after implantation.

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Goecke, H.: *The Use of Pernocton in Eclampsia*, *Monatschr. f. Geburtsh. u. Gynäk.* 88: 170, 1931.

A comparison is made by Goecke of 34 cases of eclampsia treated with pernocton and 40 other cases in which pernocton was not used. In the pernocton series only 4 had convulsions after delivery as compared with 9 cases in the series in which pernocton was not employed. No injury to the child due to pernocton was observed. Neither were there any instances of hyperexcitability which is frequently seen when pernocton is used to produce twilight sleep and after gynecologic operations. Pernocton did not reduce blood pressure hence in the cases where the blood pressure remained elevated after delivery, venesection was performed.

The author mentions that in spite of the use of pernocton he still favors emptying the uterus as early as possible, especially by cesarean section. Pernocton therapy is especially indicated in postpartum eclampsia, likewise in cases where after delivery, convulsions seem imminent.

J. P. GREENHILL.

Harding, Victor J., and Van Wyck, H. B.: *Effects of Hypertonic Saline in the Toxemias of Later Pregnancy*, *Canadian M. A. J.* 24: 635, 1931.

Although the authors were unable to produce albuminuria and increased blood pressure in normal pregnancies, both could be increased, even with convulsions occurring, in the gravid toxemia patient by the administration of hypertonic saline solutions. By bed rest and salt-free mixed diet the findings largely subsided only to be increased again after sodium chloride readministration. Sodium bicarbonate has, in their experience, had a comparable influence, probably due to a sodium chloride retention. They maintain that the retention or abnormal distribution of water is caused by these salts. Proteins are harmless while salt restriction is a necessary part of prenatal care. Hypertonic saline solutions are contraindicated in all obstetric toxemias, even postoperatively, since such therapy may be disastrous.

H. CLOSE HESSELTINE.

## THE FALLACIES OF TRICHOMONAS VAGINALIS VAGINITIS

### I. STREPTOCOCCI AS THE ETIOLOGIC AGENTS

H. CLOSE HESSELTINE, M.S., M.D., CHICAGO, ILL.

*(From the Department of Obstetrics and Gynecology of the University of Chicago and Affiliated Chicago Lying-In Hospital)*

NOTWITHSTANDING reported observations and numerous recommended therapeutic procedures, very little has been done to determine the pathogenicity of these trichomonads. For this reason a preliminary report is made of experimentation with the vaginal flagellates, which indicates that the vaginal trichomonads live on bacteria and are possibly nonpathogenic. The technic for the separation of the flagellates and bacteria by the washing and the micromanipulation methods is described.

### SOURCE AND ACTION OF TRICHOMONADS

Speculations on the sources and species of the tetratrichomonads are conflicting. Lynch and Hegner believe that the vaginal and digestive tract flagellates are identical and that they may live in any of the hollow viscera, conditions permitting, while Kofoed, Stein and Cope, and others find variations between these. Perhaps these differences are not great, especially if it can be shown that the supposed cultural and morphologic variations are actually resulting from environmental factors, such as type and number of bacteria,  $P_H$ , etc.

Hegner, Kofoed, Hogue, and Hibbert indicate that a mixed or abnormal bacterial flora is associated with this disease, which findings are comparable to this series and the unreported cases from the University of Iowa. Hibbert and Greenhill state that transplanted vaginal discharge containing trichomonads did not produce the clinical entity, which means that the recipients were immune not only to the trichomonads but to all other pathogens contained in the discharge.

It is well established that patients suffering from "Trichomonas vaginitis" are prone to have recurrences, especially at or following the catamenia. It is equally well known that exacerbations of or extensions from gonorrheal cervical infections are often related to the menstrual period. By analogy, one might argue that the etiologic agents of "Trichomonas vaginitis" were bacteria with their foci in the deeper vaginal epithelium or in the cervical glands. Such infections present difficulties in effecting prompt and consistent cures.

## EXPERIMENTAL DATA AND DISCUSSION

The most conclusive study in determining pathogenicity of vaginal flagellates would involve freeing the trichomonads from all bacteria, fungi and other infective agents, and transplanting them into the vaginas of uninfected women, and then being able to recover and identify the organisms after the disease has developed. If strict isolation proves impossible, proof of pathogenicity must rely upon indirect evidence, such as the production of the disease by bacteria commonly associated with the parasites, with the demonstration of the relationship between the bacteria

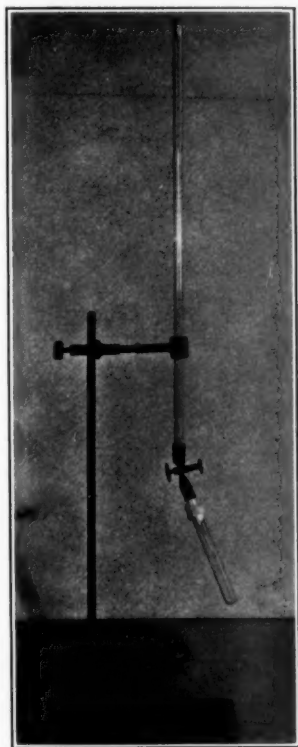


Fig. 1.—Apparatus (mounted as used) for washing by gravity.

and the trichomonads. Finally, it may be shown that neither the flagellates nor the bacteria by themselves are pathogenic, but that one group activates the other. It has been suggested that the whipping motion of the flagellae produces irritation, but in that event all flagellates should cause an irritation, even the spermatozoa. Inasmuch as the trichomonads are considered noninvaders, any possible pathogenicity must result from toxic substances formed by one of three processes: (1) Liberation from ingested bacteria, (2) production in holozoic activity, or (3) synthesis through holophytic behavior. So far, none of these properties has been demonstrated.



For the past several months, attempts have been made to separate the trichomonads from bacteria, but failure has occurred in every instance, as the flagellates disintegrate within forty-eight hours and leave behind no living bacteria. This indicates that the trichomonads probably destroy the bacteria by ingestion. Cleveland observed that *T. faecalis* could not subsist in the absence of bacteria. In order to show that the methods used by the writer to isolate the protozoa did not

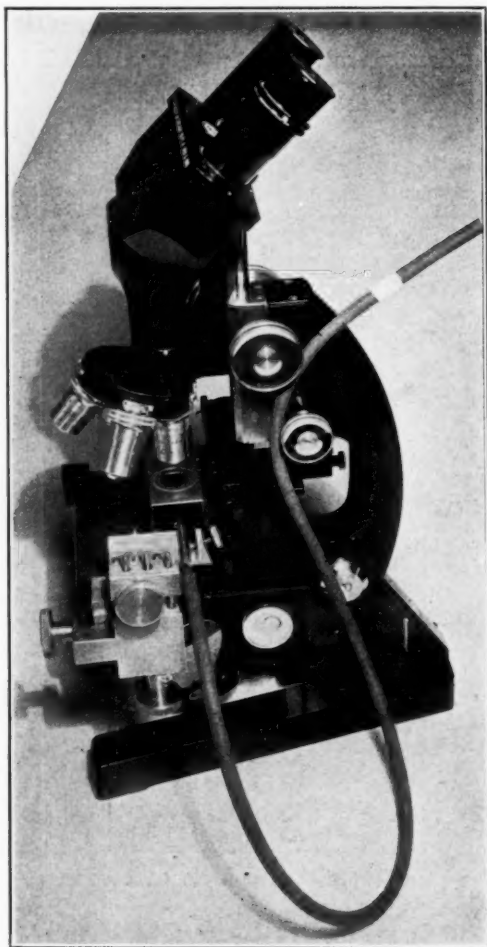


Fig. 2.—Micromanipulator (arranged as used), moist chamber, and pipette with capillary tip.

damage these organisms, bacteria were occasionally added to the cultures, which resulted in growth of the trichomonads.

Various techniques have been suggested and used in separating microscopic organisms, but, for this study, the washing method, by the use of gravity, proved easier and more reliable than the single-cell isolation with microcapillary pipettes and micromanipulation. The techniques for both methods are briefly as follows:

*The Washing Method.*—A 100 cm. glass tube, 1 or 2 cm. in diameter, is used, with a stopcock or its equivalent at the bottom (Fig. 1). The vaginal discharge is collected in a sterile test tube and one to ten drops are placed on the surface of the full column of Locke's solution. The equipment is kept at room temperature. At two and one-half minute intervals, after five minutes have elapsed, four to ten drops of the suspension are collected from the bottom into the sterile test tube. Each specimen is agitated and one drop is examined for the presence of flagellates.

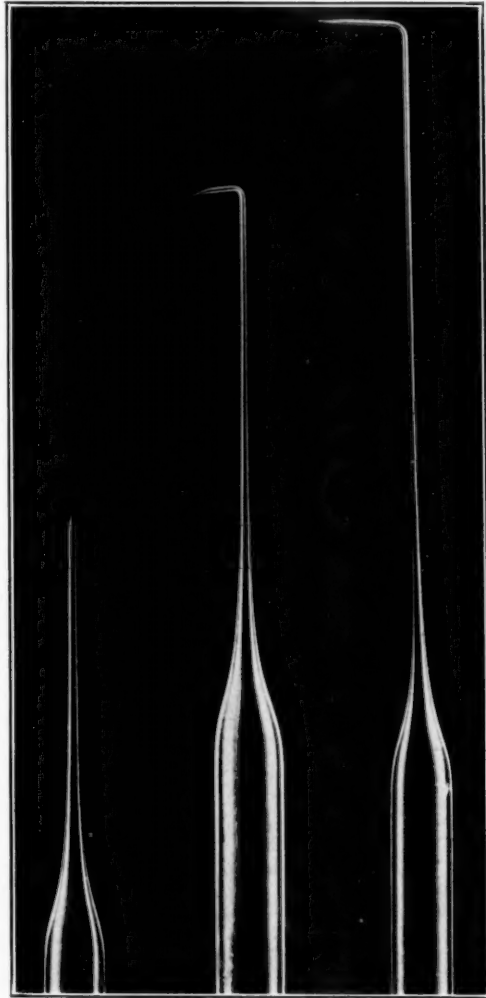


Fig. 3.—Type of microcapillary pipette employed.

From the first specimen containing flagellates, a loopful is added to each of two culture tubes (Locke's solution with 5 per cent human serum and a few red cells). One tube is incubated without further contamination, while bacteria, either in pure culture or separated from the vaginal cells, débris, and protozoa by medium fine Berkefeld filters, are added to the second tube. Whenever flagellates grew in the first tube, bacteria were found in the original smear of the inoculum as well as in the culture. Furthermore, when these organisms failed to live, bacteria were not found.

*Micromanipulation.*—For the single-cell isolation by micromanipulation, a modified Barber apparatus (Fig. 2) was employed. A moist chamber (Fig. 2), made from square copper tubing and having surfaces the size of a standard glass slide, was used. On one side and closer to the left end there is one large circular opening the width of the tube, and directly opposite this is a smaller opening, over which a cover slip may be placed so that a hanging drop may be suspended within the compartment. The pipettes (Fig. 3) are made of glass, with lumens varying from 20 to 50 microns in diameter. Aspiration is accomplished by a syringe or, after practice, the mouth may be used, freeing the hands. The pipette is placed in the apparatus, with its bent tip pointing upward in the center of the field, and is then lowered out of the visual field. A drop of diluted vaginal discharge on a cover slip is mounted on the chamber. The field is studied until a trichomonad, apparently free from bacteria externally, is found (several dilutions may be necessary). The chamber is moved so that the flagellate is over the pipette end, after which the pipette is elevated until it enters the field of vision, when slight aspiration is made, drawing the organism into the pipette. To prevent capillary action the small portion of the pipette is filled in advance with Locke's solution. After catching an organism, the pipette is removed and its contents transferred to a culture tube. The process may be repeated as often as necessary, with new sterile equipment.

Since they reproduce asexually by longitudinal binary fission, a single uninjured flagellate should be sufficient for each culture. The controlled cultures indicate that when bacteria are added the organisms are able to live. Many cultures have been made without controls, but so far the trichomonads have failed to grow in the absence of bacteria (Table I).

If the vaginal trichomonads are nonpathogenic, some other form of infection must exist to produce the symptoms. In an attempt to find possible foci of infection, a study has been made on clinic patients with vaginal trichomoniasis at the Chicago Lying-In Hospital.

TABLE I. SURVIVAL OF VAGINAL TRICHOMONADS IN MODIFIED LOCKE'S MEDIUM WITH AND WITHOUT BACTERIA

TRICHOMONADS ISOLATED FROM VAGINA OF PATIENT	WITHOUT BACTERIA (WASHING METHOD)	WITH BACTERIA (CONTROL)
1	Died within 24 hours	Lived
2	Died within 24 hours	Lived
3	Died within 24 hours	Lived
4	Died within 24 hours	Lived
	(Cell isolation—micromanipulation)	
5	Died within 24 hours	Lived
6	Died within 24 hours	Lived

In one year there were 87 such patients (Table II), of whom 78, or 90.8 per cent, had cervicitis or endocervicitis, or persistent sinuses at the apex of the vagina, following total hysterectomy; 3.4 per cent had no cervical lesions and 5.7 per cent did not have a complete examination. This high incidence of cervical infection corresponds closely to Klegman's<sup>14</sup> finding.

While endeavoring to obtain the trichomonads in pure culture in sufficient number for inoculations, other organisms were used in an at-

tempt to produce the clinical picture (Table III). The bacteria employed were gram-positive nonhemolytic, pleomorphic streptococci, selected because they were consistently present in abnormal vaginal flora of trichomoniasis. Maryan's work shows that chronic cervical infection is produced usually by streptococci having characteristics of those employed in this study. Nine different strains were used, the first three cultures being from sources other than trichomoniasis, although they appeared to belong to the same general group; the remaining six were isolated from the vaginal discharge of patients having trichomoniasis. The first five strains were established by colony isolation on blood agar plates, while the last four cultures were obtained by progressive dilution in dextrose brain broth. Isolation by dilution prevented, possibly, the organisms from losing their selective action.

Twenty-two pregnant patients (Table III) were treated by adding bacterial cultures directly to the vagina. In three instances, trichomonads were present in an abnormal vaginal flora before the inoculation, but subjective symptoms were absent and the only clinical change was a cervical erosion and an increased vaginal discharge. After the "treatment" one patient had an increased vaginal discharge, one showed no change, while in the third the clinical entity developed. In contrast, trichomonads appeared in the vagina of one patient (previously free

TABLE II. CLASSIFICATION OF PATIENTS WITH VAGINAL TRICHOMONADS

	GYNECOLOGY	OBSTETRICS	TOTAL
Cervical lesions	41 (Draining apical sinus following total hysterectomy in one)	38 (In three fungi were present)	79
No cervical lesions	3	0	3
Miscellaneous (Pelvic examination not complete)	4	1	5
Total	48	39	87

from the flagellate) after the bacterial transfer, yet no symptoms or clinical changes occurred. Among the remaining 17 protozoan-(vaginal) free patients who were inoculated, two developed vaginitis. One presented a typical picture, except that the discharge was not foamy, while the second had an atypical infection. In the entire group, vaginal discharge was increased in six, while in three, vaginitis developed within ninety-six hours after the inoculation.

The clinical condition, described as "trichomonas vaginitis," has been produced twice in the absence of trichomonads, and only once in their presence. Furthermore, it was produced by streptococci isolated on blood agar plates as well as through dilution in dextrose brain broth media. Table III indicates the strains and numbers of patients used.

TABLE III. THE PRODUCTION OF EXPERIMENTAL VAGINITIS CLINICALLY RESEMBLING "TRICHOMONAS VAGINITIS" WITH NONHEMOLYTIC STREPTOCOCCI

STREPTOCOCCI FROM PATIENT	METHOD OF ISOLATION	NUMBER OF PATIENTS INOCULATED INTRA-VAGINALLY	RESULTS		
			NO. WITH INCREASED DISCHARGE	NO. WITH "TRICHOMONAS VAGINITIS" ENTITY	
1. Without "Trichomonas vaginitis"	Blood agar plate	3	1	1	
2. Without "Trichomonas vaginitis"	Blood agar plate	3	1	1	
3. Without "Trichomonas vaginitis"	Blood agar plate	2	0	0	
4. With "Trichomonas vaginitis"	Blood agar plate	6	3	0	
		(Trichomonads appeared in 1 after inoculation)	(Trichomonads were present in 1 before inoculation)		
5. With "Trichomonas vaginitis"	Blood agar plate	1	0	0	
6. With "Trichomonas vaginitis"	Dilution in dextrose brain broth	2	0	0	
7. With "Trichomonas vaginitis"	Dilution in dextrose brain broth	1	0	0	
8. With "Trichomonas vaginitis"	Dilution in dextrose brain broth	1	0	0	
9. With "Trichomonas vaginitis"	Dilution in dextrose brain broth	3	1	1	(Trichomonads present before inoculation)
		(Trichomonads were present in 1 before inoculation, but no symptoms developed)			
Total		22	6	3	



Since precautionary measures had to be followed throughout this study, it required many weeks to complete this series, necessitating the use of several bacterial strains in order to have new unattenuated cultures.

#### SUMMARY AND CONCLUSIONS

The clinical entity of "Trichomonas vaginitis" is undoubtedly produced by some infective agent, but the pathogenicity of the *T. vaginalis* Donn  has not been conclusively proved.

From the studies described above, it might be deduced that the trichomonas is not pathogenic, but further experimental work must be done before positive conclusions are warranted. The accurate determination of the status of these vaginal flagellates is needed before better therapeutic procedures can be expected. If the trichomonads are not pathogenic, our methods of treating this clinical entity may be materially improved. Until the significance of the trichomonas can be settled, it will be necessary to continue with the treatments that are producing the best results.

From the information obtained the following impressions are drawn:

1. The pathogenicity of *T. vaginalis* Donn  is still unproved.
2. Some of the fallacies of the arguments favoring pathogenicity of this protozoon have been mentioned.
3. Experimental findings indicate that the *T. vaginalis* Donn  is a scavenger and feeds upon bacteria.
4. *T. vaginalis* Donn  fails to grow in the medium used in the absence of bacteria.
5. Presumably, an abnormal vaginal flora, or the condition producing it, is a prerequisite for the invasion of the trichomonads.
6. A nonhemolytic streptococcus is capable of producing a "trichomonas vaginitis" in the absence of trichomonads.
7. Two methods for separating trichomonads from the bacteria are described.
8. Further studies are in progress to aid in establishing proof of the actual status of the *T. vaginalis* Donn .

An appreciation is extended to Dr. G. M. Dack for his advice in obtaining bacteriologic cultures.

NOTE: Bibliography is included in the author's reprints.

## A NEW CONCEPT OF THE MECHANISM OF VERTEX ENGAGEMENT IN SIMPLE FLAT PELVES

WILLIAM CARL STUDE, A.B., M.D., AND VICTOR E. SCHERMAN, B.S., M.D.,  
ST. LOUIS, MO.

*(From the Department of Gynecology and Obstetrics of the St. Louis University  
School of Medicine)*

TEXTBOOK descriptions of the mechanism of vertex engagement in simple flat pelves state that the head attempts to enter such pelves in the attitude of flexion as in the normal mechanism. They further state that the head (apparently referring to its biparietal portion) slips off to one side of the true conjugate, which is too short to permit of its passage, so that the narrower bitemporal region may be brought into relation with this diameter and the biparietal diameter brought into position in the larger space opposite the sacroiliac joint. Following this, the head is said to rotate into the transverse position, the biparietal portion becoming temporarily arrested at the inlet while the bitemporal diameter passes through the true conjugate by reason of the mechanism of deflection which permits the narrower frontal portion of the head to slip through the inlet. When this is accomplished the biparietal portion follows.

In analyzing the mechanism attention should be given to the following facts. In the first place roentgenopelvimetrie studies of normal and simple flat pelves show that whereas the length of some of the antero-posterior diameters of the inlet lateral to the true conjugate may be as great as the true conjugate yet none is greater. The increase in their length posteriorly by reason of the concavity on either side of the sacral promontory is counterbalanced by a decrease in their length anteriorly due to the arching backward of the anterolateral border of the inlet (Fig. 1). These studies further show that the length of those diameters extending from the sacral promontory obliquely forward to the anterolateral borders of the inlet, roughly corresponding to the sacrocotyloid diameters, rarely equals the length of the biparietal cephalic diameter except in unusually large pelves. This fact is important because it is to such a diameter that the biparietal cephalic diameter is presented in an obliquely posterior position of the occiput. Another important fact is that the greatest available transverse diameters of normal and simple flat pelves usually exceed the lengths of either oblique diameters. Secondly, it is to be remembered that when the fetal head is in the attitude of normal flexion as opposed to that of acute or enforced flexion, its presenting circumference is irregularly oval, the long axis of this

ovoid being intermediate in length between the suboccipitobregmatic and occipitofrontal diameters whereas the widest transverse or biparietal diameter occupies an eccentric position nearer the occipital than the frontal end (Fig. 2). Therefore, unless some pathologic factor brings about a displacement of this presenting ovoid toward that side of the pelvis occupied by its frontal portion, the biparietal area is not normally presented for passage through the true conjugate and therefore cannot be displaced from a position it never occupied. Finally and most

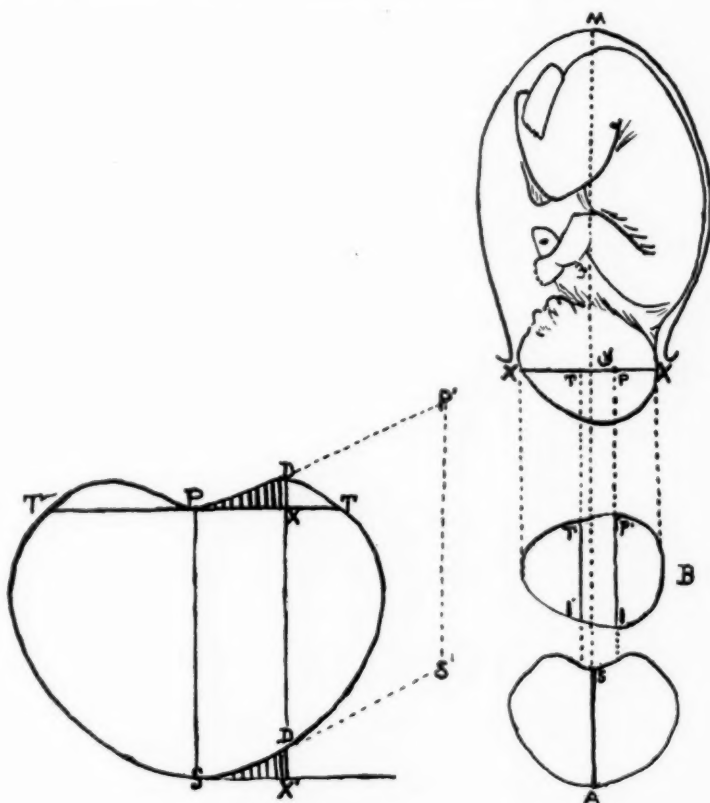


Fig. 1.

Fig. 2.

Fig. 1.—Diagram illustrates that contrary to past teachings there is no more room lateral to the true conjugate than is offered by the true conjugate itself. Then line *TT* represents a transverse diameter passing through the tip of the sacral promontory. *PS*, the true conjugate; *DD*, an anteroposterior diameter extending forward from the concavity lateral to the sacral promontory. The assumed increase in the length of *DD* over that of *PS* due to its prolongation, *XD*, posterior to the line *TT* is counterbalanced by the decrease *DX'* in its anterior extension.

Fig. 2.—*B* shows outline of fetal head in a coronal plane, *XX*, passing through its biparietal and bitemporal areas (points *P* and *T*, top figure, and lines *P'I* and *T'I*, center figure). The projection of the outline of the presenting cephalic ovoid upon the outline of the pelvic inlet shows that normally the biparietal area lies lateral to the true conjugate.

important is the fact that a shorter cephalic diameter is presented for passage through the true conjugate when the head lies transversely than when it lies obliquely (Figs. 3 and 4).

Obviously, therefore, the usual descriptions of the mechanism convey erroneous and inadequate impressions of the size of the pelvis lateral to the true conjugate. They emphasize the importance of an assumed displacement of the fetal head and fail to attach proper significance to that phase of the mechanism which has as its object the rotation of the cephalic ovoid into the transverse position. We believe that the latter is the cardinal factor since it brings a shorter cephalic diameter into position for passage through the true conjugate than when the head

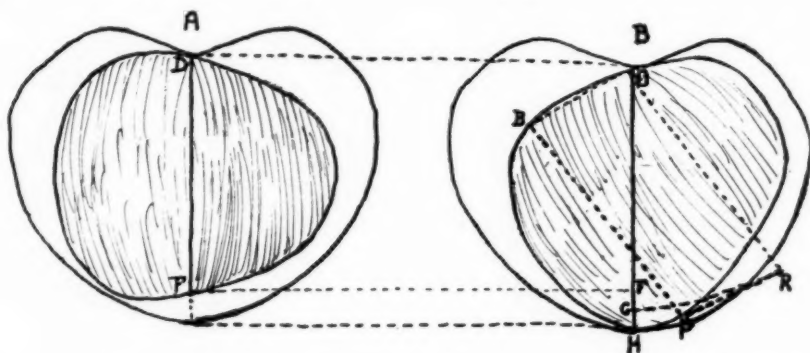


Fig. 3.—Showing relationship between the various diameters of a normal pelvic inlet and a normal sized head.  $B'P$ , biparietal diameter.  $PR$  and  $B'D$ , two equal and parallel lines.  $DE$  equal to  $B'P$ .  $RC$ , arc of projection of  $DE$  on  $DH$ .  $DC$ , therefore equal to  $B'P$ . The cephalic diameter which is presented for passage through the true conjugate in oblique positions of the head is greater than that cephalic diameter ( $DF$ ) which is so presented in transverse positions and is even greater than the biparietal diameter.

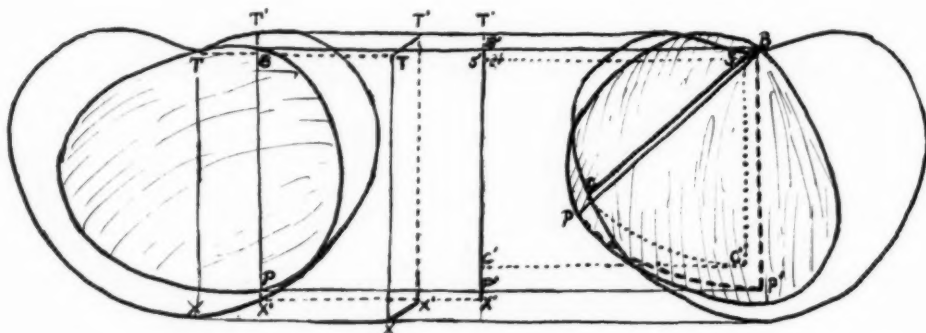


Fig. 4.—Shows relationship between the various diameters of a normal pelvic inlet and a normal sized head.  $TX$ , true conjugate;  $T'X'$ , anteroposterior diameter extending forward from sacroiliac chondrosis and equal in length to  $TX$ .  $BP$ ,  $B'P'$  and  $B'P'$  represent length of biparietal cephalic diameter.  $SC$ ,  $SC'$ , and  $S'C'$  represent length of sacrocytoid diameter. In flat pelvis almost similar relationships exist except that  $BP$  may exceed  $TX$  and  $T'X'$ .

lies obliquely. Unless the head is pathologically displaced this particular diameter will be the bitemporal. This rotation at the same time enables the head to utilize the greatest available diameters of the inlet which as mentioned in a previous paper are the true conjugate and obstetric transverse diameters and which together determine the size of the inlet.\*

\*Stude, W. C., and Scherman, V. E.: *AM. J. OBST. & GYNEC.* 23: 524, 1932.

In line with the foregoing we offer the following as our impressions of the mechanism under discussion. As the head approaches the inlet in an obliquely posterior position of the occiput, the biparietal diameter is the first to become arrested, since the sacrocyloid diameter is too short to permit of its passage. Immediately upon this arrest deflection occurs because the downward force of the uterine contractions is exerted through the center of the cephalic ovoid causing rotation of the head

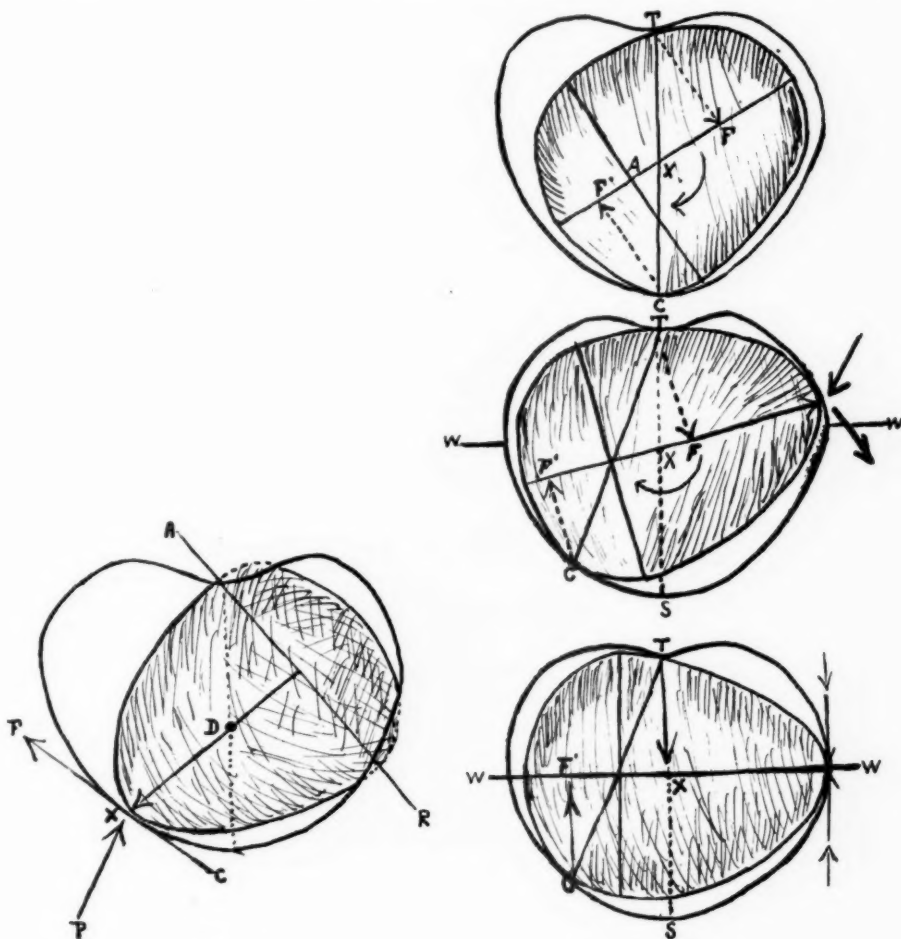


Fig. 5.

Fig. 6.

Fig. 5.—AR represents axis of resistance about which head rotates and undergoes deflection, thereby causing the frontal area to meet the pelvic resistance at X. From this point it is caused to rotate posteriorly by the component CF of the forces PX and DX.

Fig. 6.—Illustrates the mechanism whereby an oblique anterior position of the occiput is converted into a transverse position at the inlet as explained in the text. WW, line of greatest transverse diameter.

around an axis represented by the eccentrically situated biparietal diameter. In this process of deflection, the long axis of the cephalic ovoid is increased and the frontal portion of the head comes to meet the



resistance of the anterolateral border of the opposite side of the pelvic inlet since the oblique diameter is not long enough to permit the passage of this cephalic diameter. To the force which the frontal portion of the head is now exerting against the anterolateral border of the inlet there is added a counterforce exerted by the pelvis. The component of these forces serves to direct the frontal area of the head in a posterior direction along the anterolateral margin of the inlet until the head occupies a transverse position (Fig. 5). In this, its bitemporal diameter is presented for passage through the true conjugate while its biparietal diameter is presented for passage through an anteroposterior diameter extending forward from the concavity lateral to the sacral promontory, this diameter being usually as great as the true conjugate but not greater. Up to this point we believe the mechanism to be the same for flat pelvis and normal pelvis except in the case of especially large varieties of the latter in which it would be possible for the head to enter as L.O.P. or R.O.P.

In obliquely anterior positions of the occiput, resistance is first offered the head by the true conjugate (Fig. 6). Deflection does not immediately occur because the downward force of the uterus is exerted through the center point (*X*) of this line. Rotation around a vertical axis passing through this point is the first mechanism. It is effected by a transmission to the long axis of the presenting cephalic ovoid of the forces exerted at the points of resistance (indicated by lines *TF* and *CF'* Fig. 6 top). As soon as sufficient rotation has occurred to cause a shift of the line of resistance away from the true conjugate (Fig. 6 center) the downward force of the uterus (exerted through *X*) causes deflection of the head around this new axis of resistance (line *TC* Fig. 6 center). There results a lengthening of the long axis of the cephalic ovoid, the frontal portion of which strikes against the posterolateral border of the inlet. The latter in turn exerts a counterforce in such a manner that the component of these two forces causes the frontal area to rotate anteriorly to the transverse position. Up to this point it aids the original direction of rotation but beyond this point, or more correctly, anterior to the greatest transverse diameter of the inlet, the component force affecting the frontal area is in the opposite direction. Therefore all forces concerned in causing rotation about a vertical axis neutralize one another when the head has been brought into the transverse position (Fig. 6 bottom). This mechanism does not necessarily occur in obliquely anterior positions of the occiput associated with very large pelvis since in them the true conjugate may be sufficiently long to permit of the passage of that oblique cephalic diameter which is presented to it.

After rotation to the transverse position the mechanism of engagement in flat pelvis is the same regardless of whether the occiput was originally obliquely anterior or posterior. Further deflection occurs and the narrow frontal portion of the head descends first, thereby bringing

the head into the attitude of a more favorably compressible wedge in relation to the inlet. The counterforces exerted by the latter may now be transmitted to the biparietal region from a direction better suited to effect molding, after which descent of the biparietal area occurs.

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## OBSERVATIONS UPON ADYNAMIC ILEUS\*

### WITH REPORT OF A CASE

EDWARD A. SCHUMANN, M.D., AND JOSEPH V. MISSETT, JR., M.D.,  
PHILADELPHIA, PA.

*(From the Gynecological Service at the Kensington Hospital for Women)*

**P**ARALYTIC ileus may be defined as a motionless distention of the intestines, due to a paralysis of the muscular tunic of the bowel. It is adynamic in type, that is, there is moderate to extreme distention of part or all of the intestinal tract in the absence of any obstructive lesion. It is therefore necessarily differentiated from the mechanical or dynamic type of ileus, in which there is a definite mechanical obstruction along the course of the bowel, due to spasticity of the muscular tunic, occlusion of the lumen of the bowel from without or within or by volvulus, strangulation or herniation.

The factors concerned in the production of paralytic ileus are generally accepted as being both interference with the blood supply of the bowel, particularly the venous return, and stimulation of the abdominal sympathetic nerves whose action is inhibitory to bowel peristalsis.<sup>1</sup> Stimulation of the parasympathetic nerves excites intestinal mobility. Simultaneous stimulation of both sympathetic and parasympathetic elements leads to a domination of sympathetic or inhibitory group, and a motionless intestine results.

The exciting causes of intestinal inertia and subsequent distention may be either extraabdominal or intraabdominal. Among those occurring extraabdominally are (1) the psychic factor, from prolonged or excessive stimulation of psychic origin, which inhibits both secretory and motor functions of the gastrointestinal tract. (2) Pulmonary factor: The inertia and distention seen in acute processes, such as pneumonia, may be due to infective agencies, but are probably circulatory in origin. (3) Cardiac factor. The distention is due primarily to venous stasis. (4) Renal factor. Involvement of this retroperitoneal organ may induce ileus by reflex sympathetic stimulation.

Intraabdominal exciting causes of inertia and distention may be briefly considered as follows: (1) Prolonged intraabdominal operations, resulting in loss of heat or body fluids, badly given anesthetics, rough

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handling of the tissues or too much pressure exerted on the bowel by packs. Any or all of these factors may operate in causing sympathetic stimulation and ultimate venous stasis. (2) Prolonged strangulation of bowel or mesentery, cutting off the blood and nerve supply. May be permanent if too long a time elapses between the time of strangulation and its surgical correction. (3) Septic or inflammatory lesions, the most common variety due to local peritonitis with an arrest of peristalsis. As the infection spreads and becomes generalized the inertia and distention increase in proportion. Before the distention is great enough to cause venous stasis and ileus of the paralytic type, the ileus may be regarded as an active ileus, a physiologic mechanism intended to insure rest of the abdominal contents and to check spread of the infection. (4) Embolism and thrombosis. Involvement of such veins as the superior mesenteric and the portal lead to serious consequences as a result of impairment with the venous return.

The clinical picture of the patient suffering from paralytic ileus differs slightly according to whether the exciting cause is inflammatory or traumatic.<sup>5</sup> In the inflammatory type hyperperistalsis is seen early, later disappearing. There is marked distention with acute colicky pains, with nausea and vomiting, intermittent at first and later persistent. Early the vomitus represents the stomach contents, but as the pyloric sphincter is paralyzed the vomitus becomes fecal in character. The facial expression is one of apprehension, the cheeks are flushed, the tongue is parched and brown, there is marked dehydration and great thirst, and the bowels are obstinately constipated. The pulse is rapid but full and the temperature mounts from the beginning. There is moderate to marked leucocytosis depending upon the resistance of the patient.

The noninflammatory, nonbacterial, traumatic or reflex type of paralytic ileus gives rise to the same picture in most essentials. It differs, mainly, in the following details: (1) Severe colicky pain is not constant. (2) The distention is more marked and peristalsis is absent from the beginning. (3) The nausea and vomiting are persistent. (4) The temperature remains flat until the toxic products begin to be absorbed. (5) Leucocytosis is marked from the beginning.

Generally the picture is one of profound toxemia, with some of the symptoms of shock.<sup>4</sup> The prostration is great; the vomitus is dark and foul, and is regurgitant in type. There is a fall in blood pressure and late in the disease the pulse becomes weak and thready. The skin is moist and clammy. As the toxemia advances the patient shows evidence of cerebral irritation, manifested by muscular twitchings, and occasionally tetany. Ultimately a comatose state develops. There is suppression of urine, occasionally leading to an anuria. Obstinate constipation is the rule and frequently copious bowel evacuations signify impending death.

Blood studies by McVicar<sup>6</sup> have revealed the following important findings: (1) There is a rise in blood urea, a fall in the blood chlorides, and a rise in the CO<sub>2</sub> combining power of the plasma. (2) By a study of the chemistry of the blood, the condition can be recognized early, the severity can be measured, and the progress of treatment watched. (3) Tetany may be anticipated when the CO<sub>2</sub> combining power of the plasma is found to be above 100 volumes per cent. (4) All cases show a tendency to alkalosis, and the use of alkalis in the treatment is contraindicated.

As to the cause of death, Sims<sup>5</sup> advances three possibilities, starvation, toxic absorption, and fatigue of the nervous system. Estrem claims that there is a bacterial change, both proteolytic and putrefactive; also a primary proteose poison formed by the perverted activity of the gastrointestinal mucosa.

Hausler and Foster have advocated the theory of a shock complex rather than the formation of toxic substances.

#### TREATMENT

*A. Preventive.*—Prophylactic measures are very important, especially in postoperative cases. General and local rest are essential. General rest is prompted by morphia or other opium derivatives. Local rest is favored by the application of a tight binder, which immobilizes the abdominal wall and thus lowers the incidence of ileus.

The gastrointestinal tract is kept at rest by restricting fluids by mouth and by avoiding the use of purgatives. Especially is this important in inflammatory cases, or where there has been much manipulation of bowel or trauma to the tissues. The Fowler position promotes relaxation of the abdominal walls and encourages gravitation of any inflammatory effusions or exudates to the pelvis. Food should at first be light; overeating or solid food favors distention.

*B. Active.—Fluids:* Because of the vomiting there is a tendency toward dehydration. Since the stomach is intolerant, the fluid loss is compensated for by the administration of fluids by vein, skin, and by rectum. Glucose intravenously aids in combating starvation.

*Gastric lavage* is indicated in cases of persistent vomiting and gastric dilatation. A successful lavage will lessen upper abdominal distention and favors the return of intestinal circulation.

*Drugs:* Gray, Wells,<sup>7</sup> and others employ pituitrin hypodermically in the hope of diminishing abdominal distention. Guthrie<sup>8</sup> regards its use as dangerous. Eserine is often used. Wells uses it in doses of gr.  $\frac{1}{18}$  every hour for 4 doses. Martin and Weiss employ eserine with success in nontoxic cases. Pituitrin acts on the muscle cells, increasing tone and causing peristalsis. Eserine, on the other hand, acts on the vagus endings stimulating the bowel to contract.

*Surgery:* Guthrie<sup>3</sup> recommends enterostomy when spinal anesthesia fails, or for an aggravated case of adynamic ileus. Gray<sup>1</sup> advocates enterostomy when other methods fail, favoring ileostomy or jejunostomy. If enterostomy fails, Estrem<sup>4</sup> attributes the failure to an unwisely chosen site. Enterostomy, to be successful, must drain the liquid toxic content of the bowel. McVicar<sup>6</sup> holds that relief is dependent more on the decompression of the paralyzed bowel than on the removal of toxic intestinal contents. Such decompression allows the bowel to regain sufficient tone to start up normal peristalsis.

*Spinal Anesthesia.*—This is rapidly gaining popularity. Studdiford<sup>9</sup> says: "The probable explanation of the effect of spinal anesthesia in ileus is that the splanchnic inhibitory reflexes are blocked so that the vagus motor reflexes have full play." Neely<sup>10</sup> quotes Pitkin on the succession of events following the administration of spinal anesthesia: "With distention or paralytic ileus, a high anesthetic will produce gurgling in five minutes; gas is passed in eight to ten minutes, and a copious evacuation will occur within fifteen or twenty minutes. The abdomen becomes soft and distention disappears: an effectual therapeutic remedy."

*Chloride Administration:* The normal blood chloride range in whole blood is 450 to 520 mg. per 100 c.c. blood. In adynamic ileus there is a reduction. Nelsen injects 600 c.c. of 3 per cent sodium chloride in the pectoral muscles in mild cases. In severe cases he supplements this with 3 to 5 per cent NaCl and 5 to 10 per cent solution of glucose. Wells<sup>7</sup> claims good results from the intravenous administration of 40 c.c. of 20 per cent NaCl, and repeated in four to six hours. Hughson and Scarff use larger doses intravenously, giving as much as 60 to 70 c.c. of a 20 per cent solution of NaCl at a time.

The following case report is illustrative:

Mrs. T. Z., aged thirty-two (Kensington Hospital for Women). On admission her chief complaint was colicky pain in the epigastrium. She complained of much indigestion since the birth of only child nine years ago, accompanied by severe attacks of rumbling pain in epigastrium. Symptoms much more constant and severe for a month preceding admission. During this past month has been markedly constipated and several times has taken enemas with failure of the enema material to return. Pain did not radiate, had no relation to meals. Much nausea and gas but no vomiting. Menstrual periods very irregular for past few years. Frequent amenorrhea from three to six months. Periods very painful and scanty. Last period six weeks before admission. No urinary, cardiac, or pulmonary symptoms.

Abdomen slightly distended, peristalsis normal. Fundus markedly retroverted and retroflexed, fixed, and slightly enlarged. Ovaries palpable but free and not enlarged. Urine, blood count, and blood chemistry normal on admission. X-ray picture along with clinical history led to suspicion of gallstones and a pelvic operation with exploration of gall bladder region was decided upon.

At operation a two months' pregnancy was found, with marked retroversion. No gallstones were found and gall bladder was emptied freely. Incidental appendectomy was performed. Uterus pushed forward manually. The following day patient was in good condition, but on the third day patient was cold and



clammy, had a subnormal temperature and other evidences of shock; abdomen was markedly distended, no peristalsis, slightly rigid in the right lower quadrant. However there was no vomiting but sharp stabbing pains in the epigastrium since early in the morning with occasional cramp-like pains in the lower abdomen thought due to contraction of the uterus. On the fifth day patient's pulse rate was up, no longer showed evidence of shock. Morphine relieved pain. However, abdomen was still markedly distended. No peristalsis present. Patient still had not vomited. Stomach lavage thought advisable and much thick, dark green mucous material obtained. Patient was given  $\frac{1}{2}$  c.c. of spinocaine with complete anesthesia of the lower three-fourths of body for period of one hour. After return of sensation, abdomen seemed slightly less distended, peristalsis again heard for the first time in thirty-six hours. On the sixth day patient's abdominal condition was not improved. Pulse still elevated, temperature  $104.3^{\circ}$ .

Following an enema she began having bowel movements and at 2:00 o'clock had had five large evacuations containing much fecal material, after which the condition became much improved, temperature fell, abdomen much less distended, pulse rate decreased. Previous to this time the patient had occasionally expelled gas both by mouth and by rectum, but after repeated enemas no fecal material had been obtained and the enemas given were returned with much difficulty. Stomach washed out and two quarts of pale yellow definitely fecal smelling material was obtained. Urinary output small for amount of fluid given. Clear serous discharge from wound.

On the seventh day patient's condition was decidedly worse, temperature steadily rising, abdomen again markedly distended; however, peristalsis was still present. Enema given with no return. Patient at times delirious. Jute tube was inserted into the stomach about 6:00 P.M. and left in for several hours. About four quarts of fecal smelling and appearing material obtained, after which there was a definite decrease in the amount of distention. Temperature  $107^{\circ}$ , pulse very weak and fast, condition very poor. Patient became delirious definitely about 2:00 A.M. Became so delirious at 6:00 A.M. that she had to be given morphine and scopolamine to quiet her. Continued with an impalpable pulse until time of death at 9:00 A.M. on the eighth postoperative day.

*Autopsy Report.*—When incision was opened about 500 c.c. of clear serous fluid exuded. Just underneath the skin was found small intestines greatly dilated which had broken through the peritoneal and fascial sutures but which were in no way discolored and showed no evidence of obstruction. The intestine was then followed beginning at the rectum up through the large bowel down to the cecum, where the appendectomy wound was found intact and clean, then along the small intestine, up to the stomach. The entire intestinal tract showed no evidence of obstruction and was generally dilated to about 5 cm. in diameter, filled with gas and watery fecal material, similar to that found on gastric lavage. Stomach found distended to about four times normal size and filled with similar fluid. Gall bladder was palpated and there were no stones and no evidence of infection. Pancreas felt soft, but not acute pancreatitis. Left kidney showed hemorrhagic spots on the outer surface and the cut surface showed evidence of acute nephritis, evidently terminal. Section taken from spleen appeared that of passive congestion. Uterus and tubes as found in operation. Diagnosis: Paralytic ileus, acute dilatation of stomach, and acute nephritis (probably terminal).

*Comment.*—This case of adynamic ileus was proved by autopsy to have occurred without peritoneal infection and without mechanical factors.

Analysis of the patient's history and preoperative findings discloses no demonstrable causal factor for the condition except a history of persistent and marked constipation together with gastric indigestion.

Spinal anesthesia did not appreciably reduce the distention although it produced a return of peristalsis and relieved the acute discomfort of the patient. In this instance it was of little value in differentiating between adynamic ileus and mechanical obstruction.

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1814 SPRUCE STREET.

### THE RELATIONSHIP BETWEEN GYNECOLOGY AND ORTHOPEDICS\*

ARTHUR STEIN, M.D., F.A.C.S., NEW YORK, N. Y.

THE views and opinions given in this paper have been based on observations and deductions which I was able to make during my twelve years' association with one of the large orthopedic hospitals in the city, namely, the Hospital for Joint Diseases.

I shall refrain from citing case histories and devote attention entirely to general principles.

The relationship between gynecology and orthopedics is concerned chiefly with the differential diagnosis of the etiology of sacrolumbar pain. It was formerly believed that backache in women was solely due to gynecologic causes. Although Peiser<sup>1</sup> in 1912 emphasized the importance of sacroiliac and lumbar abnormalities as a cause of backache, gynecologists gave little heed to the subject. In 1919, Opitz and Matthes<sup>2</sup> presented an analysis of the causes of sacral pain in which they pointed out that the static dynamic mechanism and psychoneurologic factors play a prominent part in the etiology of backache. Still gynecologists did not give these causes the attention they deserved.

In recent years, however, there has been an increasing recognition of the fact that the problem presented by lumbosacral pain concerns not only gynecology but pathologic anatomy, surgery, orthopedics, and roentgenology. The belief that backache is always caused by disorders

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of the female reproductive system naturally brought the patient to the gynecologist, and thus the etiology of this symptom became peculiarly his problem. Certain gynecologists analyzed their case records to determine the frequency of sacral pain due to other than gynecologic causes. Various investigators attributed backache to gynecologic affections in from 30 to 80 per cent of the cases, Ward<sup>3</sup> placing the figure as high as 75 to 80 per cent. I<sup>4</sup> have always believed that the latter figure is too high, and more exact knowledge has now greatly reduced estimates of the relative importance of the so-called gynecologic backache.

Usually the gynecologist has attributed low back pains in women to retroversion and retroflexion, and to inflammatory conditions such as posterior parametritis, cervicitis, and prolapse; less frequently he has been able to prove that the pain is due to pressure from large fibroid tumors, incarcerated cysts, salpingitis, and carcinoma. Kark<sup>5</sup> expresses the opinion that while malpositions of the female pelvic organs occur in cases of low back pain, they are merely the accompaniment of structural and postural changes in the back. With this belief I am inclined in large measure to concur, though I would not detract from the importance of corrective gynecologic surgery. It is, however, essential that gynecologists bear in mind the fact that many conditions outside of the female generative apparatus may be involved in the production of low back pain, and it is to these that I would briefly call attention.

#### POSTURAL AND ANATOMIC FACTORS

A study of the static dynamic mechanism of the trunk-supporting structures clearly demonstrates that the muscular, cartilaginous, ligamentary and osseous structures constitute a functional unit. Any defect or inadequacy in any one of these involves all the others by shifting weight-bearing and dynamic function to points not designed to assume them. While every factor in the static dynamic mechanism intimately involves every other portion, for purposes of discussion these factors may be considered under the headings: (1) muscular tone, (2) function and pathology of cartilage, and (3) skeletal abnormalities and diseases.

1. *Muscular Tone*.—Loss of muscular tone is of primary importance in the production of both uterine displacements and orthopedic defects, since it influences directly or indirectly all portions of the trunk-supporting mechanism. In the healthy adult with a normally developed spine the curvatures are such as will allow the surfaces to take the bulk of downward pressure, and erect posture is maintained by the tone of the musculature without strain in the ligaments of the vertebral column. The line of gravity runs from a point anterior to the astragalus, upward just in front of the knee joint and between it and the common sacroiliac axis. It intersects the lumbosacral junction in front of the dorsocervical junction, behind the cervical spine, terminating in the mastoid process.

The direct weight-bearing center is at the lumbosacral junction. Movement or pelvic tilts shift the burden ordinarily controlled by the angle of the superior surface of the first sacral vertebra, and when this angle becomes greatly exaggerated (lordosis) the strains are carried as high up as the third lumbar vertebra.

The normal sacral angle, according to v. Schubert,<sup>6</sup> who made an extensive study of this region, is in younger women  $90^{\circ}$  to  $110^{\circ}$ , in older women from  $130^{\circ}$  to  $140^{\circ}$  and in pathologic conditions may be as great as  $160^{\circ}$ . In this condition of lordosis abnormal pressure is brought to bear on the intervertebral discs and the opposing surfaces of the vertebrae, to a lesser extent on the transverse processes. The constant strain and irritation brought about by this condition results in functional and anatomic changes which are prolific in the production of symptoms.

It is well to recall that muscle possesses two functions—postural tone and movement, the former controlled by the autonomic system, which should maintain correct posture without strain or fatigue. When it fails voluntary muscle contraction may be invoked to take its place, and this soon results in fatigue and pain.

On the other hand, gynecologic conditions are, of course, an important cause of loss of muscle tone. The periodic congestion incident to menstruation, the effects of pelvic degenerative and reparative processes and of the increased weight and distention due to gestation, stretch and thin the musculature of the pelvic floor, the abdominal walls and the lumbosacral region. The increased drag on the ligaments is transmitted to the osseous structures, with resulting derangement of the static dynamic mechanism, the production of lordosis with enteroptosis, easy fatigue, and pain.

Asthenia, frequently found in patients with gynecologic complaints, is a common cause of muscular inadequacy. The longer it persists the greater will be the strain on muscles, ligaments and joint cartilages. When this condition exists, and especially if it is associated with pregnancy and the postpartum period, every effort should be made to correct it.

Obesity, which is usually associated with muscular inadequacy, is a frequent cause of sacral pain at the time of the climacteric. It is a fairly common cause after childbirth, often being manifested as early as the latter part of the second or beginning of the third decade of life.

2. *Function and Pathology of Interarticular Cartilage.*—The cartilaginous intervertebral discs form cushions between the vertebrae and act as shock absorbers, and together with the intervertebral ligaments maintain elastic tension between the vertebrae. If they are subjected to abnormal pressure, they become flattened, with a resulting loss of elasticity, increased lordosis, and tilting of the pelvis.

The symptoms of this condition are defective posture, spinal rigidity and easy fatigue. They herald the onset of spondylitis with actual irritation of the spinal column.

A hitherto unsuspected cause of backache has been revealed by the studies of Schmorl and Junghanns, and of Uebermuth.<sup>8</sup> They have shown that as a result of pressure and irritation the cartilage becomes notched and sclerosed, and clumsy lipping of the intervertebral discs occurs. At times the intervertebral cartilage may herniate into the softened vertebral body (Schmorl nodule). Projections of the cartilage may penetrate into the spinal canal and cause pressure on the cord. Schmorl and Junghanns believe that the herniation is due to primary softening of the vertebrae caused simply by pressure.

It is well known that sacroiliac abnormalities constitute an important cause of backache. Due to the increasing weight in pregnancy there is a normal process of separation of both the sacroiliac and pubic synchondroses, and with repeated pregnancies this condition may become more or less permanent. Roentgenologic examination in such cases shows a deep-seated lumbar lordosis with more or less symmetrical lowering of the sacrum and ossa innominata, with pronounced rotation of the sacrum around a transverse axis, widening of the sacral symphysis and relaxation of the attachments. In these cases considerable relief may be afforded by the application of a strong supporting belt.

**3. Skeletal Abnormalities and Diseases.**—Lesions of the skeletal structures which may give rise to symptoms can conveniently be classified as follows: (1) congenital and developmental abnormalities; (2) traumatic injuries; (3) pathologic processes.

*Congenital abnormalities* of the vertebral column are so exceedingly common that Schmorl and Junghanns in a recent monograph state that the existence of a normal fifth lumbar vertebra has been questioned. They examined some 10,000 vertebrae in the effort to establish a normal standard for this structure. Brailsford<sup>9</sup> found congenital or developmental abnormalities in 26.4 per cent of the cases he examined, while Schroeder<sup>10</sup> of the Kiel Clinic places the incidence of these abnormalities at 69.8 per cent. Authorities agree that congenital defects may be present without causing symptoms. They should not be assumed to be the cause of the patient's complaint until all other possible lesions have been excluded.

Of the various types of congenital deformities Heuck<sup>11</sup> found spina bifida occulta to be the most frequent (30 per cent); next in frequency he found sacralization and lumbalization. These abnormalities are often unilateral, and then a triangular canal remains through which the nerve in its passage may be subjected to pressure and thus cause pain elsewhere in the field of its distribution. This may readily suggest a gynecologic cause for the pain.



The diagnosis of sacralization and lumbalization is readily made by the roentgenographic findings and the localization of pain when the patient stands or walks, or bends in different directions.

Other abnormalities found in the lumbosacral region are nonfusion of the laminae or of the spinous processes, and partial or complete absence of the neural arch of the first sacral vertebra.

*Spondylolisthesis*, more frequent than was formerly supposed, may be either congenital or of traumatic origin. Clinically it is characterized by shortening of the trunk, a decrease in the distance from the thorax to the symphysis pubis. The patient usually exhibits a peculiar waddling gait. The exaggerated lordosis gives rise to severe intractable pain, increased by standing and walking and relieved by lying down.

*Trauma*.—A history of injury is helpful in making the diagnosis where no other cause for backache can be discovered. Fracture of a vertebra is sometimes difficult to detect. Lateral and oblique, as well as anteroposterior, roentgenograms should be made. In unrecognized fractures patients may stand for a time without discomfort; but if they walk from half a mile to a mile, they become extremely uncomfortable and are obliged to sit down and rest.

*Spondylitis* as a cause of backache is of particular interest to gynecologists in connection with the work of Kienböck,<sup>12</sup> who has found a type of arthritis characterized by atrophy of the cartilage disc and diffuse porosis of the bone. He believes this process is dependent upon the calcium metabolism and is also related to the endocrine conditions incident to the menopause. To this type of arthritis he applied the term "arthropathia ovaripriva." Spondylitis may be due to a tuberculous process or to some focus of septic absorption. It may result from typhoid fever (typhoid spine), from yaws, dysentery, pneumonia, scarlet fever, and occasionally from gonorrhea.

*Constipation* may cause backache through the weight and drag of an overloaded colon. In this condition there is usually also an enteroptosis with its train of distressing symptoms.

Other conditions which must be borne in mind in determining the cause of lumbosacral pain are osteomalacia and rickets; more rarely osteitis fibrosa, Recklinghausen's disease, Paget's disease, and Kümmell's disease. Roentgenologic examination has at times revealed unsuspected tumor growths. It is also advisable to examine the urinary tract roentgenographically as it may harbor lesions which include backache in their symptomatology.

From this brief survey it is apparent that no other symptom known to medicine may result from such a diversity of etiologic agents as sacrolumbar pain. Again it must be reiterated that in determining the cause of pain in any individual case the whole static dynamic mechanism must be viewed as a functional unit. If any one point in the system fails the entire mechanism suffers, and pain may result at a

point far distant from the lesion causing it. Thus genu valgus, flat foot, and all deformities of the lower extremities exert an important influence on the weight-bearing mechanism.

In seeking the cause of lumbosacral pain the gynecologist, having given due attention to any pathology in his particular field, should consider the possibility that postural errors, anatomic defects, or some disease such as we have outlined may be operative in causing or aggravating the pain of which the patient complains. He should be thoroughly awake to the value of the roentgenologic examination, which usually determines where the difficulty lies. By following this policy many unnecessary gynecologic operations that fail to bring the expected relief from pain may be avoided.

This brings us back to our starting point, the relationship between gynecology and orthopedics. It is roentgenology which supplies the bond between these two branches of medicine and decides whether a particular case falls within the province of the gynecologist or that of the orthopedist.

#### SUMMARY

The rôle of gynecologic affections as a cause of lumbosacral pain has been considerably overestimated. Within recent years roentgenologic and pathologic studies of the vertebral column and pelvis have contributed greatly to our knowledge concerning the etiology of backache. It has been shown that incorrect posture, asthenia, obesity, and in fact any condition which causes undue stretching and thinning of the musculature of the abdominal walls, pelvic floor and spinal column, with dragging on the ligaments, will produce more or less lordosis and a shifting of the body weight to points not designed to support it, with resulting fatigue and pain. Skeletal abnormalities, arthritis, trauma, and various bone diseases are now recognized as important causes of lumbosacral pain. Endocrine and metabolic dysfunction are probably involved in the production of certain types of arthritis and other diseases of the osseous structures, such as rickets and osteomalacia. By keeping in mind the varied etiology of low back pain the gynecologist may at times avoid surgical attacks on the female generative organs that would inevitably fail to give the desired relief from pain.

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## DISCUSSION

DR. E. A. BULLARD.—While working in the Follow-Up Clinic of Woman's Hospital over ten years ago I first got the impression that many women were having pelvic operations for backaches which were not gynecologic. A study of the end-results of about 800 operative cases brought out strikingly these points that Dr. Stein has emphasized, namely, that though a woman may have the gynecologic pathology that is presumed to produce backache, you can perform an anatomically successful operation upon that woman and her backache may persist. About 85 per cent of those women who had successful correction of gynecologic conditions were, nevertheless, relieved of their backaches. Stimulated by that study I collected another series of nearly 200 women who had various types of pelvic pathology, each famous for producing backache, such as large fibroid tumors, fixed retroversions, procidentia, pelves crowded with tender inflammatory masses, none of whom had any backache.

The studies show clearly that we should never guarantee any woman that we will cure her backache by a gynecologic operation, because the etiology of pain in the back may be orthopedic, urologic, asthenic, neurologic, etc. I believe that we are much more cautious nowadays in promising relief of backache in the female.

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**Allen, Edward, and Priest, Fred O.: Physiological Responses of Ectopic Ovarian and Endometrial Tissue, Surg. Gynec. Obst. 55: 553, 1932.**

The anterior chamber of the eye has proved to be an ideal location for the study of growth and physiologic response of transplanted tissue.

The fact that endometrial tissue has peculiar properties of proliferation of its epithelium with invasion of adjacent structures forming typical gland-like spaces, has been further substantiated. Frequently this epithelium undergoes a metaplasia to a type resembling tubal epithelium. It has recently been suggested that tubal epithelium may undergo a transition and proliferation of its cells so as to be indistinguishable from normal endometrium.

Tubal epithelium is transplanted into the eye to see whether metamorphosis occurs into tissue of endometrial type.

Isolated segments of transplanted endometrium retain the property of alternate congestion and blanching which seem to be under the immediate control of ovarian activity.

The ease with which such a highly specialized tissue as that of the ovary can be made to live in this location is impressive.

In some instances, at least, the germinal epithelium suggests a power of proliferation. In others it suggests ability to initiate new follicular formation. This may be due to a compensatory hypertrophy following castration as indicated by the spontaneous appearance of follicles in transplants previously inactive. More definite evidence of this possibility is suggested by the regular appearance in implants of a sudden sensitivity to ordinary ovarian stimuli following castration.

One is forced to conclude that all ovarian tissue is not simultaneously responsive to known potent stimuli. This may be due to the fact that a portion is in a resistant phase or because new ovules are in the process of formation and growth. These physiologic functions are under control of blood-borne stimuli and are independent of location and nerve supply. Some of these phenomena cannot be explained, but future observations may lead to their solution.

WM. C. HENSKE.

THE IMPORTANCE OF ESTABLISHING A CONDITIONED  
REFLEX "PREGNANCY—SYPHILIS" IN THE MINDS  
OF THE MEDICAL PROFESSION\*

EDWARD L. KEYES, M.D., F.A.C.S., NEW YORK, N. Y.

**S**URPRISINGLY great is the variety in the reported statistics concerning the prevalence of syphilis in different countries and under different social conditions. Pregnant women show prodigious variation in this regard. For example, Dr. Goldberg, of the New York Tuberculosis and Health Association, has collected figures from a wide variety of sources in this country. The highest incidence is reported from Birmingham, Ala., where among 629 colored women 24.8 per cent were infected, approximately 1 in 4. In the same community only 8.7 per cent among 116 white women were infected, approximately 1 in 12. These are health department statistics and probably are weighted with a number of indigent and casual individuals. The Chicago Lying-In Hospital where the patients are mostly white has 2.6 per cent incidence of positive Wassermanns among 6,954 obstetric patients, while the Sloane Hospital here reports 3.6 per cent positive Wassermanns among 9,955 women. These again are mostly white. In comparison with these figures it would be interesting to quote the percentage of positive Wassermanns on pregnant women found in the different hospitals of greater New York. Let me select a few. Harlem Hospital, with a great preponderance of negroes, shows 15 per cent positive Wassermanns during the past five years. Lying-In Hospital shows 2.5 per cent of whites and 12 per cent of negroes. The other hospitals not separating the negroes from the whites, vary to an extraordinary degree. The Berwind Maternity Clinic reports 12 per cent positives on 367 pregnant women; the Long Island College Hospital, 6 per cent on 1,200; the Coney Island Hospital, 5 per cent on 4,746; the Nursery and Child's, 3 per cent on 1,119. In contrast, hospitals with a preponderance of private patients show extremely low incidence of positive Wassermanns. Thus the United Israel Zion Hospital of Brooklyn reports 0.3 per cent on 1,477 obstetric patients. The Jamaica Hospital reports 0.2 per cent on 635.

Anyone with medical experience realizes that the spirochete is no respecter of persons. The rich become syphilitic as well as the poor but they are, on the whole, better treated and more likely to reach the obstetric clinic at a time when the Wassermann is negative. This has encouraged many hospitals of this city to omit Wassermanns or cor-

\*Read (by invitation) at a meeting of the New York Obstetrical Society, February 14, 1933.

responding serologic tests for private patients. The obstetrician who brings in a private patient is permitted to elect whether that patient shall be tested for syphilis or not.

Now I am not an obstetrician; I am not a gynecologist; I am not a syphilologist. My interest in the prevention of venereal diseases is my excuse for appearing here tonight, representing the Social Hygiene Committee of the New York Tuberculosis and Health Association. What I hope to impress upon you is the importance of establishing a conditioned reflex, pregnancy—syphilis, in the minds of the medical profession.

Three things are perfectly well known to me and doubtless to all of you. Syphilis, unlike gonorrhea, can almost always be so treated during the course of pregnancy that the child will not be infected. The figures of Laurent are well known: 563 untreated syphilitic pregnancies left only 26.5 per cent of infants alive at the age of three months, while the same women subsequently treated for syphilis during 161 pregnancies had 91.9 per cent youngsters alive at three months. McCord at his famous Atlanta clinic chiefly among negroes reduced the stillbirths from 70 per cent to 5 per cent and increased the babies born alive from 30 per cent to 93 per cent. There is no need to multiply statistics further.

Further, syphilis, like gonorrhea, is extremely difficult to diagnose during the course of a pregnancy. Indeed we may stress the point and say that to judge from animal experiments as well as from the phenomena of human disease, pregnancy inhibits the symptoms and lesions of syphilis.

Most of you have not lived long enough to remember that at the beginning of this century there were three kinds of congenital syphilis: paternal syphilis, maternal syphilis, and syphilis inherited from both parents. Before the Wassermann reaction came along to wipe out this beautiful theory, one of the most distinguished German syphilologists had written a book crammed full of cases illustrating the successful treatment of hereditary syphilis of paternal origin by antisiphilitic treatment of the father. Fournier had developed the beautiful theory of *choc en retour* to explain how tertiary lesions occurred after pregnancy in 60 per cent to 80 per cent of the nonsyphilitic mothers who had borne syphilitic children to syphilitic fathers. This pretty theory was that these tertiary lesions were not due to the living infectious virus of syphilis (treponema being as yet undiscovered) but were due to a toxin absorbed during the nine months of pregnancy by the mother from her syphilitic child, herself thus immunized to the disease.

Reason staggered along under the weight of this theory until Wassermann and Ehrlich broke it up.

Now the excuse for venturing to summarize for you this quaint bit of medical history is because it is perhaps due to some residue of the habit resulting therefrom, that we today treat the possibility of syphilis



in pregnancy with more levity than we do that of gonorrhea. To return to the proper title of this paper we must realize the importance of establishing a conditioned reflex "Pregnancy—Syphilis" in the minds of the medical profession. Such reflex has been established as to "Pregnancy—Gonorrhea." No physician could omit to drop silver nitrate solution in the eyes of the newborn child. Yet any one of you who takes care of children is aware of lives mutilated or destroyed because a similar hard and fast rule has not been established in the minds of the medical profession with regard to syphilis. The poor are taken care of, for the routine of the clinic requires a serologic diagnosis of syphilis. The rich are not so fortunate. Let me add another phrase to your medical catchwords, "Because a woman can afford to pay for the treatment of a syphilitic child is no reason why she should be permitted to have one."

Do not offer as an excuse your hesitation to mention syphilis to an uninformed woman. There is no need to mention it. A specimen of blood may be obtained on any one of a number of other assumptions.

In conclusion let me ask you, do you take this seriously? Do you think that a physician should be required to perform a serologic test for syphilis the moment a pregnant woman applies to him? I do, for, let me repeat,

Syphilis, like gonorrhea, is no respecter of classes. To fix that in your mind let me repeat the cynical aphorism of a French urologist, "No woman, however beautiful, can give what she has not got."

Syphilis may, like gonorrhea, be difficult of diagnosis at any time during its chronic course, but pregnancy renders syphilis particularly obscure by inhibiting its somatic lesions, leaving only the blood reactions of the disease as a means of diagnosis.

Syphilis, unlike gonorrhea, can be controlled during pregnancy by treatment.

## REVIEW OF 205 CASES OF OCCIPITOPosterior POSITION

WILLIAM H. MAST, M.D., PUEBLO, COLO.

A VOLUMINOUS amount of literature has appeared in the past few years regarding the proper treatment of occipitoposterior positions and the complications incident to the proper handling of these cases. Comparing the authorities, we can readily see how confusing the literature is regarding the treatment of occipitoposterior cases. Two main views are held; one advises operative interference as soon as the cervix has dilated, the other holds the opinion that the majority of cases will rotate spontaneously, although the length of labor is prolonged. Believing this subject to be of sufficient importance, we have undertaken a review of 1128 obstetric cases. I am indebted to Dr. Clarence B. Ingraham, of Denver, for the study of these cases obtained from records in private practice. While occipitoposterior presentations were treated with serious consideration, no operative interference was instituted except for very definite reasons. The usual indications, such as emphasized by Williams, were considered as a standard.

In these 1128 cases, the occipitoposterior position occurred in 205 cases, or 1.82 per cent. No doubt many cases were seen after rotation from the occipitoposterior to the anterior had occurred. The left occipitoposterior variety occurred 16 times, or a percentage of 7.8, a ratio of 1 to 13. This is somewhat less than many authorities report. Vaux finds the left occipitoposterior position in 118 out of 212 cases.

Rotation from the occiput posterior to the occiput anterior occurred in 129 cases or 62.93 per cent. Of these cases in which rotation occurred spontaneously, forceps were used to complete the delivery 26 times, and of these 21 were low forceps and 5 were midforceps.

Delivery with the occiput in the directly posterior position is generally acknowledged to lengthen labor and predisposes to a greater incidence of maternal lacerations. West and Varnier find that rotation to the hollow of the sacrum occurs in 2 to 3 per cent of the cases. Delivery in the occipitoposterior position in this series occurred in 28 cases, 15 of which, or 7.3 per cent of the 205 cases rotated to the sacrum spontaneously and the patients were delivered without operative interference. Six cases rotated to the occiput posterior spontaneously and required operative delivery, and 7 were rotated and delivered by forceps. In other words, 53.6 per cent of the cases that rotated to the hollow of the sacrum delivered spontaneously. At times, after application of forceps in the occipitoposterior position, rotation to the anterior variety was obviously attended with considerable danger to the baby. We believe that the stress and force required to effect

rotation very often is the direct cause of serious fetal injury, and in such cases delivery in the persistent posterior position is a more rational procedure.

Podalic version and extraction were performed 3 times. Rotation from the occipitoposterior to the "deep transverse arrest" was noted in 8 cases. Low forceps were used in 6 of these cases and mid in 2. Two Scanzoni maneuvers were performed, and rotation to the anterior position accomplished before traction was employed. Manual rotation from right or left occipitoposterior position to the anterior was performed in 11 cases; of these, 9 delivered spontaneously, and in 2 cases delivery was effected by forceps. The Voorhees bag was employed once, for a placenta previa. Episiotomy was performed in 71 of the 205 cases. No cesarean section was done because of an occipitoposterior position.

Occipitoposterior presentations cause the length of labor to be increased. It will be of interest to compare the length of labor in these 205 cases:

TABLE I. LENGTH OF LABOR

Spontaneous rotation to O.A. and delivery	11 hr., 27 min.
Spontaneous rotation to O.A.; instrumental delivery	19 hr., 36 min.
Manual rotation to O.A.; spontaneous delivery	19 hr., 11 min.
Manual rotation to O.A.; instrumental delivery	26 hr., 32 min.
Spontaneous rotation to O.T.; instrumental delivery	20 hr., 13 min.
Scanzoni Maneuver	43 hr., 18 min.
Spontaneous rotation to O.P.; instrumental delivery	25 hr., 27 min.
Spontaneous rotation to O.P. and delivery	8 hr., 25 min.
Instrumental rotation to O.P.; instrumental delivery	20 hr., 28 min.

The comparison between the course of labor in the primiparous and multiparous woman is given in Table II:

TABLE II

	PRIMIPARA	MULTIPARA
Hours of labor	17 hr., 36 min.	9 hr., 30 min.
Forceps delivery	55 cases, 26.83 per cent	2 cases, 0.98 per cent
Version and extraction	9 hr., 40 min.	2 hr., 59 min.
Average weight of baby	6 lbs., 8 oz.	7 lbs., 3 oz.
Operative interference, all types	59 cases, 28.78 per cent	3 cases, 1.46 per cent

The influence of pre- and postmaturity was investigated. Fourteen days within either side of the estimated date of confinement was considered to be a normal limit. This is shown in Table III:

TABLE III

20 CASES	PREMATURE	POSTMATURITY
Average maturity	31 days	21 days
Average weight	5 lbs., 7 oz.	8 lbs., 2 oz.
Length of labor	14 hr., 55 min.	12 hr., 57 min.
Operative interference	5 cases	2 cases
No interference	8 cases	5 cases

There were no maternal deaths in this series. The fetal mortality was 8 out of 205 cases, or 3.9 per cent. Three versions and extractions were performed, with a death of 2. None of these was elective in type. A review of the fetal deaths is given briefly:

1. Primipara, pelvic measurements normal. Long, hard labor, forceps applied after twelve hours of ineffectual, strong pains. Delivered in persistent posterior position, 2 coils of cord very tight about neck. Baby gasped only once.

2. Version and extraction, dry labor, membranes ruptured two hours after onset of pains. No dilatation after fourteen hours of hard pains, Voorhees bag inserted. Podalic version and extraction, very difficult to perform, due to contraction of uterus. Cord became prolapsed early in start of version and extraction and pulsation was very feeble. Stillborn, heart action for ten minutes.

3. Normal R.O.P., primipara, easy labor. No operative interference, born in persistent posterior position. Heart tones not heard during end of second stage, and considerable meconium present. Baby born dead.

4. Edema of placenta. Short labor, baby born in persistent posterior position, lived ten minutes, gasped once. Placenta large, weight 1,126 gm.

5. Primipara, normal measurements, membranes ruptured three and one-half hours before onset of labor. Labor then induced with castor oil and quinine, pains hard but not effectual. Patient exhausted. Cervix dilated manually, impossible to attempt version, as uterus contracted hard about baby. Forceps applied in O.P. on floating head. Baby dead, probable cerebral injury, no autopsy.

6. Version and extraction, membranes ruptured with first pain, arm prolapsed to elbow one and one-half hours after onset of labor, no pulsation of cord at beginning of version and extraction. Baby breathed several times. No notification of labor was made in this case until the prolapsed arm was recognized by the patient.

7. Primipara, normal measurements, nephritic toxemia, casts, albumin, and blood pressure elevated. Manual dilatation of cervix, membranes ruptured and mid-forceps applied. Delivered in persistent posterior position, as it was impossible to rotate head. Child died in three days; cerebral hemorrhage.

8. Multipara, head did not engage until second stage, labor long. Pallid asphyxia, with marked overlapping of skull bones. Patient given pituitrin towards the end of second stage. The pituitrin used was prior to the present standardization, and resulted in excessive reaction with rapid descent of the head.

A review of these cases shows us that occipitoposterior positions may be considered with a certain equanimity of mind, but must be most carefully observed and interference instituted when necessary. Operative interference occurred in 30 per cent of these cases. The fetal mortality was 3.9 per cent, and excluding Cases 3, 4, and 6, we have a corrected mortality of 2.44 per cent. This compares very favorably with other statistics, for instance, Vaux, in 212 cases, reports 8 infant deaths and 5 stillbirths; Bill, in a review of 500 cases which he personally delivered, reports a fetal mortality of 2 per cent for all babies, and excluding such cases as congenital deformity of heart, enlarged thymus, etc., the corrected fetal mortality was 1 per cent. The fetal mortality of the Cleveland Maternity Hospital, in which the general policy and methods of Bill were practiced, was 4.47 per cent, with a

corrected mortality of 3.1 per cent. Ingraham, reporting a series of 100 cases from the Johns Hopkins Hospital, found a fetal mortality of 5 per cent with a corrected mortality of 3 per cent.

For the physician who has had only the average training in obstetrics, and who practices the latter along with other specialties in medicine, we believe that the better treatment of these posterior positions is the conservative, knowing that from 70 to 80 per cent will rotate spontaneously. Then, when indicated, interference may be resorted to according to the exigencies of the individual case. For the physician who has had considerable training and experience, we still believe the conservative treatment to be that of choice.

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### THYROTOXICOSIS IN ITS RELATION TO PREGNANCY

J. T. WALLACE, M.D., NEW YORK, N. Y.

(From the Obstetrical Service of the Brooklyn Hospital)

IN ANY study of hyperthyroidism or thyrotoxicosis as a complication of pregnancy, one is at once struck by the extreme rarity of the condition. In considering pregnancy as an accompaniment of hyperthyroidism, Lahey in a series of 3,678 patients operated on for toxic goiter, found 15 who were pregnant, an incidence of 0.41 per cent. Mussey, obstetrician at The Mayo Clinic, reports 42 cases of coexisting pregnancy in 7,228 cases of hyperthyroidism in women, an incidence of 0.6 per cent. On the other hand, in considering thyrotoxicosis as a complication of pregnancy, the viewpoint in which we as obstetricians are primarily interested, Yoakam of Detroit, in the heart of the so-called goiter belt, reports an incidence of 3.7 per cent in a large series of pregnant women, while Markoe was able to find only 8 cases of real hyperthyroidism in 100,000 pregnancies at the New York Lying-In Hospital.

In reviewing the literature, one is likewise impressed with the dearth of articles bearing on this subject. Falls of the Obstetric Department of the University of Illinois has explained this paucity of literature by stating that no one man has had a wide experience in this type of obstetric complication. In the literature of the past ten years, every writer of importance has almost without exception commented upon the rarity of coexisting pregnancy and thyrotoxicosis. There are listed in the *Index Medicus* for the ten-year period 1921 to 1931, sixteen articles in all languages dealing with or bearing upon the subject. Some of these are nothing more than case reports.

The experience of The Brooklyn Hospital has been in close accord with that recorded by others. From 1921 to 1931 there were admitted



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For the physician who has had only the average training in obstetrics, and who practices the latter along with other specialties in medicine, we believe that the better treatment of these posterior positions is the conservative, knowing that from 70 to 80 per cent will rotate spontaneously. Then, when indicated, interference may be resorted to according to the exigencies of the individual case. For the physician who has had considerable training and experience, we still believe the conservative treatment to be that of choice.

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In reviewing the literature, one is likewise impressed with the dearth of articles bearing on this subject. Falls of the Obstetric Department of the University of Illinois has explained this paucity of literature by stating that no one man has had a wide experience in this type of obstetric complication. In the literature of the past ten years, every writer of importance has almost without exception commented upon the rarity of coexisting pregnancy and thyrotoxicosis. There are listed in the *Index Medicus* for the ten-year period 1921 to 1931, sixteen articles in all languages dealing with or bearing upon the subject. Some of these are nothing more than case reports.

The experience of The Brooklyn Hospital has been in close accord with that recorded by others. From 1921 to 1931 there were admitted

to the obstetric service there, approximately 11,571 women. I have been able by careful search through files and cross files to find nine cases of pregnancy complicated by thyrotoxicosis. We have had in addition to these 9 cases, 3 cases in whom subtotal thyroidectomies had previously been done and were followed by pregnancy and 4 cases delivered there in whom thyrotoxicosis requiring operation is known to have subsequently arisen. There was no evidence to show that pregnancy was in any way responsible for exciting the thyrotoxicosis that made operation necessary later and in those where pregnancy occurred following the thyroid operations, no recurrence of symptoms was caused by it. Most authorities advise against pregnancy for at least two years following thyroidectomy, though many instances have been cited where pregnancy occurred very soon afterward with no ill effects.

Of the 9 cases of thyrotoxicosis in this series, in two the symptoms were of such mild character as to cast grave doubt on their being real cases of thyrotoxicosis. In neither were any of the cardinal clinical findings of exophthalmus, lid-lag, tachycardia, tremor or thyroid enlargement recorded in the physical examination. Neither had basal metabolic estimations while in the hospital. In neither was the labor or delivery complicated in any way. In one the puerperium was uncomplicated, in the other a postpartum pyuria with fever and chills failed to bring out any evidences of thyrotoxicosis. It seems doubtful that these two cases should really be included in the series.

A third case having slight thyroid enlargement with slight tremor and no other symptoms was in for study at the fourth month of gestation. Basal metabolism was +10 and it was decided that her symptoms were so mild that her pregnancy might be carried to term without danger. She was not delivered at the Brooklyn Hospital, but I am told that her pregnancy, labor, and delivery were entirely normal.

There were two cases in which thyrotoxicosis was suspected prepartum and postpartum reactions were attributed to this condition. In the first there was slight enlargement of the isthmus of the thyroid, slight exophthalmus and tachycardia. No basal metabolic estimations were made either before or during hospitalization. Sudden increase in pulse rate to 130 and 120 the first and eleventh days postpartum were thought due to hyperthyroidism. In the second case, a moderate enlargement of the thyroid was noted on admission to the prenatal clinic. She was at once referred to the medical clinic where the opinion was expressed that no thyrotoxicosis existed. A basal metabolic rate of +17 was regarded as unreliable because the patient ate before the test. Nothing more arose in her prenatal course to suggest overactivity of the thyroid. Labor was rather slow and nagging and of nineteen hours' duration. Delivery was by forceps control. Her pulse was rapid at times during labor and delivery, ranging from 96 to 160. Bleeding during and following delivery was normal. Two hours after delivery she suddenly went into collapse, respiration became rapid and shallow with expectoration of blood tinged sputum, cyanosis appeared and the pulse rose to 200. Medical consultation noted cardiac dilatation and basal râles of heart failure and suggested thyroid crisis as the cause. Recovery was gradual over a period of several hours with the use of morphine and digifoline. In reviewing this case in the light of 3 cases of sudden intrapartum and postpartum collapse due to aspiration during or following inhalation anesthesia and exhibiting very similar symptoms, seen and studied by the obstetric service during the past year,

and in view of the very early appearance of symptoms, absence of high temperature and recovery without the use of iodine or thyroxin, those of the obstetric department who were in charge at the time have wondered if this might not have been such a condition rather than a thyroid crisis.

Three patients of the nine were aborted in the early weeks of their pregnancies because of symptoms of thyrotoxicosis. In the first, a girl of twenty-three had had babies three years and nine months previous to this interruption. With the first she had a twelve hour labor during which a manual rotation from R.O.P. to L.O.A. was done, with the second a twelve hour labor with Scanzoni rotation from R.O.P. to R.O.A. In neither did she manifest any evidences of thyrotoxicosis. On physical examination she manifested a unilateral exophthalmus without other eye signs, slight tremor, moderate elevation of pulse rate, and a slight degree of thyroid enlargement. A metabolism test was done, but through some error not recorded. Interruption of the pregnancy was accomplished by dilatation and curettage under gas-oxygen and ether anesthesia without exacerbation of the symptoms of thyrotoxicosis. This patient came under my observation as a private patient a month after the birth of her third baby and was seen through the vicissitudes of acute mastitis, influenza, an induced abortion, and an acute bilateral salpingo-oophoritis over a period of three years. There was during this time no recurrence of her thyrotoxicosis. The second patient aborted was a thirty-four-year-old multipara who had had a difficult delivery at home with her first baby nine years previously. No evidence of thyrotoxicosis was noted on her previous admission. On admission for interruption she was complaining of nervousness, palpitation, dyspnea, and enlargement of the thyroid gland. She exhibited a slight exophthalmus and smooth symmetrical enlargement of the thyroid without lid-lag or tremor. Her metabolic rate was +23, pulse 80 to 100, blood pressure 110/70. In speaking of metabolic estimations, it may be well at this point to call attention to the more widely accepted views on the normal metabolic rate during pregnancy. Sandiford and Wheeler have shown that the rate remains normal up to the last three months. During this last trimester it rises 25 to 30 per cent. They have shown likewise that this increase is not due to increased thyroid secretion, but rather to the increase in protoplasmic mass. A diagnosis of hyperthyroidism complicated by early pregnancy was concurred in by a medical consultant and the patient aborted in the seventh week of her pregnancy by dilatation and curettage under gas-oxygen and ether anesthesia. She made an uneventful recovery without aggravation of her thyroid symptoms. The third case aborted was a multipara, aged thirty-nine, who had had a thyroid operation, probably ligation, twenty years previously. For the past two or three years she had been getting progressively more nervous. Physical examination revealed slight exophthalmus without lid-lag or tremor and an adenomatous thyroid. Her basal metabolic rate was +24. It was the opinion of the medical consultant that at her age the pregnancy might activate her adenomatous thyroid in a dangerous degree. Her pregnancy was interrupted at two months by dilatation of the cervix and removal of the products of conception. Her postoperative course was uneventful.

The last case in this series was one of adenoma in which there is some reason for believing that rapidly repeated pregnancies were instrumental in stirring the thyroid into overactivity. She had five full-term pregnancies and one miscarriage in a period of six years. She was admitted to the medical clinic complaining of enlargement of the thyroid, first noted during a pregnancy four years previously, nervousness, palpitation, excessive sweating of the hands and tremor since that time. There was no lid-lag or exophthalmus, but there were present a fine tremor of the fingers, flushing of the skin, a quick Tache and moist palms. The thyroid enlargement was due to a nodule in the right lobe. Basal metabolism was +19.

She was six weeks pregnant and was referred to the prenatal clinic. She was followed closely in the medical, surgical, and obstetric clinics. The tumor in the thyroid grew somewhat larger. Her nervous symptoms and palpitation were ameliorated by  $\frac{1}{2}$  grain doses of luminal given twice daily. Lugol's solution, 5 minims, was given once a week. A metabolism test done in the sixth month of her gestation was +21. No increase in toxic symptoms was noted during the remainder of her pregnancy. She went into labor as the result of the administration of castor oil and quinine when at term and had a rapid labor with spontaneous delivery. Her postpartum course was entirely normal. It is of interest to note that this baby had a cleft palate and harelip. Her fifth baby was a so-called blue baby and died in five days from hemorrhages. Williamson of Pittsburgh reports fetal anomalies in mothers suffering from thyrotoxicosis in a considerable number of instances. He reported 7 cases of melena neonatorum, 1 congenital heart, and 4 anencephalics in 48 such cases. Most other authorities, however, have failed to note such anomalies and have expressed opinions that they are no more common here than elsewhere.

It is obvious that no conclusions can be drawn from so small a group of cases as this. I shall therefore close by giving a résumé of the conclusions arrived at by workers in some of the larger thyroid clinics, comparing or contrasting where possible with the work done in this hospital. The articles referred to most frequently and consistently in the literature of the past ten years have been those of Mussey, Plummer and Boothby of The Mayo Clinic, Lahey of Boston, Yoakam and Plass of Detroit and Iowa, Falls of the University of Illinois, and J. W. Hinton of New York. In foreign countries, Fahrni of Canada, Gardiner-Hill of England and Seitz of Germany have been the larger contributors.

All are agreed that simple colloid goiter presents no problem other than the administration of iodine or thyroid extract as a prophylactic measure in the prevention of congenital goiter. In the simple enlargement of the thyroid so frequently seen accompanying pregnancy and without toxic symptoms, most authorities have advised the use of iodine throughout pregnancy. In this country iodine is preferred by most, while in Europe, thyroid extract would seem to be the more favored.

From the literature available at this time the cases of thyrotoxicosis from adenomatous goiter during pregnancy would seem to be considerably fewer than those from exophthalmic goiter. The explanation is a twofold one; first, only about one-third of all cases of thyrotoxicosis are adenomatous in origin; second, adenomatous thyrotoxicosis is in a large percentage of cases a condition that arises at an age when a woman's reproductive powers are waning and pregnancy consequently occurs less frequently. In dealing with either toxic or nontoxic adenoma in pregnancy, all are in thorough accord that iodine or thyroid extract should never be used at any time or in any dose except as a preparatory preoperative measure because of the danger of increasing a thyrotoxicosis already present or creating one in a dormant gland. There is,



nevertheless, an occasional case reported in which iodine has been used in adenoma without its activation and at least one in which it was of benefit. In the series reported here, there is one such case. In toxic adenoma, the danger seems to be less from the toxemia itself than from the strain pregnancy, labor, and delivery imposes upon organs already damaged by a long continued thyroid toxemia. A hard labor and difficult delivery have more than once been the last straw that broke the back of a heart weakened by a long continued thyroid toxemia. On the other hand, several writers have expressed the opinion that the burden of several pregnancies following in rapid succession in patients with quiescent adenoma has been responsible for the activation of these adenomas. The last case in our series would seem possibly to substantiate this theory.

In true exophthalmic goiter or Graves' disease, pregnancy is a very unusual complication, as a very large majority of those women suffering from this disease are rendered sterile by it, and when pregnancy does occur, conception has usually taken place during a remission. Gardiner-Hill of England and Seitz of Germany report a much higher incidence of pregnancy than do any of the American writers. Their figures, however, were compiled before the present-day wide use of iodine in the treatment of thyroid conditions. A second pregnancy in a persistent Graves' disease is still more unusual. In an occasional case, the onset of hyperthyroidism occurs during pregnancy, and in these the symptoms are often rapid and fulminating. It is often only with extreme difficulty that the symptoms of mild thyrotoxicosis are differentiated from those of the nervous state that frequently accompanies the early months of pregnancy. It is emphasized by nearly all writers that hyperemesis gravidum may sometimes be that of a beginning thyrotoxicosis rather than one due to the pregnancy, and that all such cases should be investigated from that standpoint. It is said that hyperemesis due to thyrotoxicosis responds to Lugol's solution in truly dramatic fashion.

When the symptoms of thyrotoxicosis in pregnancy are definitely established, the procedure to be followed depends upon several factors. The two factors of major importance are, of course, the severity of the thyroid intoxication, and secondly the period of gestation. Pregnancy may influence thyrotoxicosis in one of three ways: one, in a fair percentage of instances the thyrotoxicosis is definitely improved. In an occasional case this improvement is permanent. Two, the pregnancy may neither ameliorate nor aggravate the thyrotoxicosis. Three, the pregnancy may definitely and markedly increase the thyrotoxicosis. Mussey states that in his series of cases he found no evidence that pregnancy influenced the course of exophthalmic goiter in any way. Complications due to long standing chronic thyroid toxemia must always be given the most careful consideration. The effect of pregnancy on

any given case of thyrotoxicosis may, therefore, be determined only by a careful and prolonged study of the case in question.

Where the symptoms are mild and do not progress, no treatment at all is necessary, or iodine may be used throughout the pregnancy. There were two such cases in our group. Neither had iodine. It seems to be the consensus of opinion that all patients manifesting symptoms of hyperthyroidism, except those with adenoma, may safely be given iodine during gestation without fear of making these symptoms worse, and often may be the means of enabling such a patient to get through her pregnancy without thyroid operation. If the disease is to progress, it will do so in spite of and not because of the iodine therapy. Hinton and Lahey, both surgeons, are the dissenters on this point in saying that iodine should never be used except as a preparation for operation.

All authors referred to in this paper with the exception of Hinton agree that from a strictly medical standpoint, abortion is practically never indicated. If the symptoms are relatively mild they will probably remain so; if they are becoming definitely worse, the dangers of inciting thyroid crisis by abortion or a possible subsequent infection far outweigh the benefits of abortion, as real thyrotoxicosis seldom subsides, but must be dealt with *per se* sooner or later regardless of the abortion. We had three cases in which early abortion was done. In at least one, the subsequent course would seem from a strictly medical standpoint to indicate that abortion was unnecessary.

In each series of cases presented by the various workers quoted in this paper, thyroid operations, usually subtotal thyroidectomies, were performed in the majority of their really advanced toxic cases. The older method of preliminary ligation of the superior thyroid arteries has been almost entirely replaced by the use of iodine preoperatively, though before the use of iodine, it alone without further surgery was often responsible for sufficient subsidence of the thyrotoxicosis for successful termination of the pregnancy. The presence of pregnancy did not in itself increase the operative mortality or complications in those cases subjected to operation. The operation of subtotal thyroidectomy was as effective in relieving the symptoms of thyrotoxicosis in the pregnant as is the operation in the nonpregnant. These results were as permanent as might have been expected in the nonpregnant. The incidence of abortion, miscarriage, and premature labor following operation on the thyroid was almost nil and was far less than might have been expected had the cases been allowed to continue in progression without operative interference. There were no cases in our series where a thyroid operation of any kind was performed during pregnancy.

The procedure of choice then would seem to be an adequate regimen of rest and sedation, iodine therapy in thyrotoxicosis from exophthalmic goiter and most careful observation and study by all clinical and laboratory methods at our command throughout the period of gestation. Doubly

cautious observation during labor and a type of delivery designed to shorten the second stage as much as is commensurate with safety. In an occasional case, particularly in premature labors caused by the thyrotoxicosis itself, it has been found expedient by some workers to deliver by vaginal or abdominal cesarean section. If the thyrotoxicosis continues to progress in spite of these measures and reaches a degree demanding some form of interference, occasionally ligation or more frequently subtotal thyroidectomy should be resorted to rather than abortion or induction of labor prematurely before viability of the child. In an occasional case where the symptoms of thyrotoxicosis have increased with great rapidity and suddenness near term, induction of labor may seem wise to avoid the possible strain of labor and delivery before equilibrium has been reestablished after thyroid operation.

35-15 EIGHTY-SIXTH STREET.  
JACKSON HEIGHTS.

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**Francillon-Lobre and Dalsace: Tubal Insufflation and Hysterio-salpingography.**  
*Bull. de la Soc. d'Obst. et de Gynéc.* 2: 91, 1932.

Gynecologists are divided into two groups, the one employs the Rubin insufflation test exclusively to determine tubal patency, and the other hysterosalpingography. The authors report a series of 450 cases of sterility among which 74 tubal insufflation tests were performed. In 27 cases only insufflation was performed and 5 of these patients (18.6 per cent) became pregnant. It was strange that in three of the 5 cases of pregnancy the insufflation test revealed closed tubes.

In 31 cases insufflation was followed by the injection of lipiodol. The latter was done only when the insufflation test was negative or no pregnancy followed the Rubin test for six months. In 26 cases the result of hysterosalpingography was identical with the insufflation test but in 5 cases the tubes were permeable to lipiodol but had been impermeable at the time of insufflation. Among the 31 cases there were 6 pregnancies (19.3 per cent) after the injection of lipiodol. In 8 instances the authors first injected lipiodol and later performed a tubal insufflation test and in all the cases the latter test corroborated the former. No pregnancy occurred although the tubes were patent in 4 cases.

This study reveals that the injection of lipiodol resulted in a pregnancy 9 times (23 per cent) where insufflation failed but in not a single instance did gestation follow an insufflation test which was made after a negative lipiodol test. This cannot be explained on a mechanical basis. The authors maintain that insufflation and hysterosalpingography each have their indications and the latter may yield results when insufflation has failed.

J. P. GREENHILL.

## ELEPHANTIASIS OF THE VULVA

WITH AN ANALYSIS OF TWENTY-SIX CASES IN NEGRO WOMEN, FROM THE  
RECORDS OF CHARITY HOSPITAL IN NEW ORLEANS

J. THORNWELL WITHERSPOON, M.A. (OXON.), M.D., AND ELIZABETH M.  
McFETRIDGE, M.A., NEW ORLEANS, LA.

GENITAL elephantiasis is characterized by the same pathologic changes and exhibits the same general etiology as other types of elephantiasis, but it is unique, in the opinion of many observers, in the part which syphilis plays in its production. Many years ago Bandler pointed out that the tertiary manifestations of syphilis, which are so frequently seen in old prostitutes in the form of diffuse syphilomas, are really elephantiasic conditions, and his demonstration of spirochetes in the tissues and in the venous and lymphatic structures makes his theory quite tenable. McDough, Hill, Mracek, Frances, and Adamson have cited similar cases, in many of which the transition from the original syphilitic lesion to true elephantiasis was even more conclusive. But in syphilis also the infectious factor is necessary for the transition. Saboraud may be correct in his opinion that an abrasion is not necessary for its entrance, but infection of some sort is prerequisite, and the portal of entry is quite clear in such a group of cases as that reported by Frances, for instance, all of which exhibited more or less extensive ulceration.

The tendency of syphilitic processes to cause lymphedema, the so-called edema induratum, edema indurativum or edema scleroux, which follows initial lesions, is observed in everyday practice and needs no further proof. It results, according to Lang, from a condition of increased tension in the affected parts, it is a constant accompaniment of the initial lesions of syphilis, and it is nearly always found in the genital areas. It complicates the lesions of constitutional syphilis, and it reappears with the tertiary manifestations of the disease. In the early stages, when the proper local and general treatment is undertaken, this edema slowly but steadily subsides, leaving no residue. In the late period, in both men and women, it tends to be persistent, and the hypertrophy may progress until it has reached monstrous proportions. The edematous process is the result primarily of the occlusion of the lymphatic channels from coagulation of the lymph substance, which is caused by the biologic activities of the spirochetes, or it may arise from the original syphilitic focus, as the result of a specific inflammatory process of the lymph vessels.

In the cases reported by Ravogli the elephantiasis was always the result of an extended ulcerative process originating in tertiary syphilis and occasionally associated with local tuberculosis, which itself tends to cause a further destruction. Any type of bacteria, it would seem, might be responsible for the infection, and Heidingsfeld, discussing Ravogli's contribution, quotes a particularly interesting case of his own to prove the possibility of the gonococcus as the offending organism. According to Ravogli, the steps of the pathologic change are always the same: when extensive chronic genital ulcers of the phagedenic type are present, as the result of a diffuse gummatous infiltration, the ulcerative process is an open door to the entrance of any type of infection, and the chronic hypertrophic lymphangitis which results eventually terminates in true elephantiasis of the vulva.

#### ANALYSIS OF CASES

The tendency of even experienced clinicians to diagnose as elephantiasis any type of genital hypertrophy or edema is evident in the fact that although 41 cases are filed in the records of Charity Hospital in New Orleans from 1911 through 1931 under the caption of elephantiasis of the vulva, 15 had to be eliminated from this study: neither clinically nor microscopically did the description of the disease meet the cardinal requirements for a diagnosis, the presence of a fibromatosis or hypertrophy of the underlying connective tissue. A single illustration of the error will suffice. A female colored patient in her twenties entered the hospital exhibiting a marked edema and enlargement of the vulvar structures, in addition to a general glandular enlargement, a febrile reaction and a skin rash of the maculopapular type. Her chief complaint was the discomfort of the vulvar hypertrophy. The Wassermann test was plus 4, intensive specific treatment was begun, and within ten days a complete symptomatic and anatomic cure had been achieved, the prompt response to antisyphilitic treatment proving that the condition was purely syphilitic.

Eliminating these 15 cases, then, we have remaining 26 cases which can be accepted for purposes of study, and which, curiously enough, all occurred in the colored race, as did, for that matter, 14 of the 15 cases discarded. The disease is very uncommon in white women, but Hill and others have called attention to its relatively high incidence in negroes, which is probably to be explained by the frequency of venereal infection in this race. The very small hospital incidence of vulvar elephantiasis, an infinitesimal fraction of 1 per cent, should be noted. The hospital population during the two decades covered by this study approximated 400,000, almost equally divided between white and colored, and represents so true a cross-section of the general population that the small incidence of the disease may fairly be accepted as actual and not accidental.



Since colored women are notoriously prone to ignore disease until it causes intolerable discomfort or acute pain, it is not surprising to find that in many instances the hypertrophy had attained a considerable size and had lasted a considerable time before relief was sought. In one instance the condition had been noted for more than ten years, and the average duration of symptoms was twenty-five months, though it must be pointed out again that it is extremely likely in every instance that the changes had been in effect for some time before the patient realized their presence. Estimates of size are seldom satisfactory, and this study is no exception to the rule, for the lesions are variously and not very exactly described as the size of the thumb, of the fist, of an orange, and of a pineapple. In one instance the tumor hung almost to the knees and approximated the Hottentot apron in appearance, while the ulceration of the entire surface was intolerably foul.

This particular patient exhibited also multiple uterine fibroids which were visible on a casual inspection of the abdomen, and two other women had the same type of tumor, which is, as is well known, exceedingly frequent in the colored race. Salpingitis was noted in only one case, which is surprising, in view of the high incidence of this disease in colored women. One patient had a chronic nephritis. In two cases there were characteristic maculopapular rashes, while chaneroid occurred three times and chanere once. Whether the chanere represented a reinfection or is to be explained in some other way is an interesting field for speculation.

The age range was from twenty to forty-nine years, the majority of the patients (15) being between twenty and thirty years and the number diminishing with each succeeding decade. The age incidence is what one would expect; since syphilitic infection is a predisposing factor, the incidence of syphilis will naturally be highest in the years when syphilitic infection is most likely to be acquired. To consider the subject from a different angle, the comparative infrequency of vulvar elephantiasis in older women may perhaps be explained also on the basis of the lessened lymphatic circulation which is characteristic of advancing years.

The complaints registered on admission are quite typical of the race from which they emanated. Although a degree of hypertrophy that must have made locomotion at least inconvenient was noted in every instance, only 19 patients specifically complained of it. Local pain was complained of in only 5 cases, perhaps because of the lessened sensibility of the negro upon which we have already commented. Local itching and burning on urination were frequent complaints. Four patients complained vaguely of "pain in the stomach," for which examination disclosed no reason and which does not seem a logical symptom of elephantiasis. One is forced to the conclusion, based on a long experience with negro women, that because they are inarticulate they resort to a

complaint of "pain in the stomach" whenever they are afflicted with some discomfort for which they are unable to find the proper words.

The local physical findings included involvement of the entire vulva in 11 cases, unilateral hypertrophy of the labia in 5, hypertrophy of the labia minora in 4, and of the clitoris in 7. In 18 cases, 70 per cent of the series, ulceration was marked, this high percentage being about what one would expect in a race whose ideas of personal hygiene are frequently elementary. While a general glandular enlargement was noted in 3 cases, in only one instance was it stated specifically that the inguinal glands were not involved. This may, of course, mean that the findings were uniformly negative, but we are inclined to doubt this conclusion.

Blood studies were done too infrequently to warrant comment, and while pus cells were found persistently in the urine of all patients who exhibited ulcerative lesions, this finding in a noncatheterized specimen has little practical significance. Cervical smears were not taken routinely in the early years of this study, and in the tests made only one positive finding (gram-negative intracellular diplococci) was reported, the high percentage of negative results being quite typical, although specific disease is very frequent in the colored women. Donovan's bodies, the organisms of granuloma inguinale, were apparently not looked for in any case.

In the cases which occurred prior to 1921 the blood Wassermann was not done routinely, and 9 fall into this group. In the other 17 cases the Wassermann test was positive (plus 3 or plus 4) in 8, almost 50 per cent of this group, and negative in 9, although in 4 of the latter clinical syphilis was either present at the time of the examination, or, judging from the history, had been present earlier. Thus 71 per cent of the cases studied from this standpoint furnish either a serologic or a clinical diagnosis of syphilis, and offer additional proof of the importance of the syphilitic factor in the production of elephantiasis of the vulva.

Two of the patients were such poor risks that operation could not be considered, and they were discharged after local treatment of a purely palliative character. Four other patients refused operation and signed discharge slips releasing the hospital of responsibility for them. In the remaining 20 cases surgery was done, the operations being performed by 16 different men. In 2 cases unilateral removal of the labia was considered sufficient, in the other 18 a more or less complete vulvectomy was performed, in 7 instances the clitoris being included in the excision. Local analgesia was employed twice and spinal 5 times; the remaining operations were done under general anesthesia.

It is generally granted that the electrocautery or the radioknife is ideal for extensive cases of vulvar elephantiasis because by this technic tissues are sealed as excision is done and the need for sutures is either entirely eliminated or greatly reduced. That a broad mass of surface

is left to heal by granulation, with resulting distortion and contraction, is not a valid objection in a disease in which these features are already marked. Either the radioknife or the electrocautery was used in practically all of the later cases in this series.

Drainage was done routinely in the cases associated with ulceration. In 3 instances the wounds were packed or were left open to heal by granulation, the area of excision being so extensive that approximation of the edges was impossible. In all other instances the wound was closed more or less completely by silkworm or catgut sutures, which usually remained in place until the eighth day.

Preoperative treatment consisted of measures to secure local cleanliness, chiefly douches, sitz baths and irrigations. The importance of clearing up extensive ulcerated areas and eliminating foul discharges prior to operation is so obvious as not to need comment. Antisyphilitic treatment was instituted on both laboratory and clinical indications. Both the local and the constitutional treatment was continued postoperatively, and the use of drying powders was particularly effective in the larger wounds. Healing is notoriously slow in diseases of this sort, owing to the poor nutrition of the parts and the practical difficulties of preventing infection, and it is not surprising that sloughing occurred in 8 cases. In 4 cases, in each of which the clitoris had been removed, postoperative catheterization was necessary.

Eleven patients had a febrile reaction above 100.4° F., which was considered normal for the condition, in several instances the temperature reaching 104°. The reaction lasted on an average ten days, the longest duration being twenty-three days. The hospital stay days varied from seven to sixty and averaged twenty-three.

One patient, a young woman, twenty-four years of age, developed a right basal pneumonia the day after operation. Whether this was the exacerbation of a previous, undetected respiratory infection, or whether it was a true aspiration pneumonia is not clear, though it should be remarked that the latter condition as a postoperative complication is not very usual in the South. Her recovery was prompt. A second patient had a rather severe local hemorrhage shortly after operation, which was controlled, with some difficulty, by the application of additional sutures under anesthesia.

Two of the 20 surgical patients died, one from acute myocarditis on the fourth day postoperative, the other from pelvic peritonitis on the twentieth day. The diagnosis in each instance was verified by autopsy. It is perhaps more than mere coincidence that these women were the oldest patients in the series, forty-three and forty-nine years of age respectively. One of them, the older, is so typical of her race and its reaction to illness that special mention might be made of her. She exhibited the very large, ulcerated overgrowth which has already been described, and she had a uterus several times its normal size due to the presence of multiple fibroids which were causing menorrhagia. She

was extremely toxic on admission, and preoperative treatment, although undertaken intensively, had little effect on either her general or her local condition. Operation was therefore done without further delay, with the idea of ridding her of her source of infection, although it was realized that she was not a good surgical risk. The excision of the vulva, even with the electrocautery, was exceedingly tedious, the procedure occupying the better part of an hour. Her immediate postoperative reaction was quite satisfactory, but the toxemia persisted in spite of every effort to overcome it, and death finally occurred on the twentieth day from pelvic peritonitis. It seems incredible in this medically enlightened age that even an ignorant woman could permit herself to reach such an advanced stage in a disease that is not generally supposed to threaten life, but physicians who have had much experience with colored patients know that such instances of neglect are only too frequent.

It is interesting to note that all the pathologic findings stressed as essential by Ravogli were noted in some combination in all the cases in this series. Malignancy was not a factor in any instance, and one wonders why, since chronic irritation is certainly a notable feature of the disease.

#### SUMMARY

1. Elephantiasis is a clinical and pathologic entity in which the essential pathologic change is not so much the edema which is the result of lymph stasis as it is a fibromatosis or hypertrophy of the underlying connective tissue.

2. While lymph stasis is an essential step in the development of the disease, and can be caused by any type of trauma or infiltration, the hypertrophic changes of the underlying connective tissue cannot occur until another factor, generally granted to be infection of some sort, has been superimposed. The streptococcus is the commonest infecting agent, but any other organism might be responsible. The intermediate step of infection is necessary even in the type of elephantiasis caused by filariae and other parasites.

3. Elephantiasis of the vulva, the pathology of which is set forth in some detail, is in the opinion of many observers caused by syphilis in the majority of cases. Proof of this conclusion is adduced.

4. A series of 26 cases from the records of Charity Hospital in New Orleans is presented in some detail. All of these cases occurred in colored women, the majority of whom were in their twenties and early thirties. In nearly three-quarters of all cases clinical or serologic syphilis could be demonstrated, and in practically the same percentage ulceration was a factor, the portal of entry for the infection thus being clear. The symptomatology, physical findings, mode of treatment, postoperative course and immediate results are reported.

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NOTE: The reader is referred to the excellent bibliographies attached to Ravogli's papers for the full literature on the subject.

512 HIBERNIA BUILDING.

4810 ST. CHARLES AVENUE.

## AN ANALYSIS OF 220 CASES OF ABDOMINAL CESAREAN SECTIONS\*

E. D. COLVIN, M.D., ATLANTA, GA.

(From the Department of Obstetrics of Emory University School of Medicine)

THIS analysis is an attempt to record the details of the abdominal cesarean sections performed in Atlanta's larger hospitals during the five-year period from 1925 to 1930. Other abdominal sections were performed in smaller institutions, but incomplete records could not supply the desired information and these were not included in the survey.

The seven hospitals cooperating in the survey were as follows: Wesley Memorial, Georgia Baptist, Crawford W. Long Memorial, Piedmont, St. Joseph's, and the white and colored units of Grady Memorial Hospital. The latter is the charity hospital for the city.

For comparative purposes, an effort is made to follow the outlines of similar analyses from other cities.

### INCIDENCE OF OPERATION AND DEATH

As noted in Table I, 20,286 women were delivered in the seven hospitals during the five-year period, with 220 abdominal sections, an inci-

TABLE I. INCIDENCE OF OPERATION AND MORTALITY

HOSPITAL	TOTAL DELIV.	CESAREAN SECTIONS	INCIDENCE OPERATION	DEATHS	PER CENT MORTALITY
A	2396	49	1 to 48	4	8.2
B	1071	62	1 to 17	4	6.4
C	1026	19	1 to 54	0	0
D	2668	44	1 to 60	2	4.5
E	5054	18	1 to 280	2	11.1
F	7087	14	1 to 506	0	0
G	984	14	1 to 70	0	0
Total	20286	220	1 to 92	12	5.5

\*Read before the Fulton County Medical Society, November, 19, 1931.



dence of one in 92 hospital deliveries. Twelve women died following operation, an incidence of one death in 18 operations, or a mortality rate of 5.5 per cent.

The incidence of operation varied from one in 17, to one in 506 hospital deliveries. The mortality rate varied from zero to 11.1 per cent. The 220 operations were performed by 48 operators, only 7 of whom did more than 12 operations each. The greatest number of operations performed by any one operator was 21.

#### TYPES OF OPERATION

TABLE II. DETAILS OF DIFFERENT TYPES OF OPERATION

TYPE	NO.	INCIDENCE	PER CENT	DEATHS	INCIDENCE OF DEATH	PER CENT MORTALITY
Classical	190	1 to 1.1	86.4	11	1 to 17	5.8
Low cervical	21	1 to 10	9.5	1	1 to 21	4.8
Porro	9	1 to 24	4.1	0	0	0
Total	220	1 to 92	1.8	12	1 to 18	5.5

Only 5 of the 48 operators attempted the low cervical type of operation. Eight of the 11 deaths following the classical sections occurred within six days after the operation. The woman dying after the low cervical section lived thirty-one days.

#### GENERAL CONSIDERATIONS

The incidence of cesarean section was 0.7 per cent higher in 1928 than in any other year comprising this analysis.

It was found that 91.8 per cent of the women had reached the eighth calendar month of pregnancy, and that 62.8 per cent were at term.

Only 4.2 per cent were considered over term by the attendants.

The age of the patients varied from fifteen to forty-two years.

Primigravidae made up 55.9 per cent of the series.

#### DURATION OF LABOR

In 59.6 per cent, labor had not started when the operation was performed. Of the women in labor, 30 per cent were in labor less than twenty-five hours; 2.7 per cent between twenty-five and forty-five hours; 2.3 per cent between forty-five and sixty hours; and 2.7 per cent were in labor between seventy-two and one hundred and forty hours before the operation was performed. Of ten women in labor sixty or more hours, three were delivered by classical section followed by removal of the uterus; two by classical section; and five by low cervical operation. The long labors, with the exception of four, were among colored women at the charity hospital. Here, the low cervical type of operation shouldered the responsibility of potentially infected cases and carried through without a mortality. The Porro operation was performed in all frankly infected cases.

## CONDITION OF THE MEMBRANES

In 81.8 per cent of the women, the membranes had not ruptured at the time the operation was performed. It was found that 7.7 per cent of the 13.6 per cent whose membranes had ruptured, were not ruptured longer than ten hours before the operation was performed.

## VAGINAL MANIPULATIONS

In 37.8 per cent of the series, the nurse's record revealed that vaginal examinations were made from one to twenty times preceding the operation. Twenty charts gave evidence of vaginal manipulation or examination, at home, before the patient was admitted to the hospital. Vaginal manipulations, excluding examinations, include the following: unsuccessful attempt to insert a bag; vaginal packing at home to control hemorrhage, while the patient was being transferred to the hospital, in two instances; unsuccessful attempts to deliver with forceps, followed by failure to perform version in two instances. In one of the latter cases the baby was diagnosed as dead before the section was performed.

## INDICATIONS

The indications for the 220 operations are recorded in Table III. An effort was made to group them under the outstanding indications, where multiple indications were found.

TABLE III. INDICATIONS

INDICATION	NO.	PER CENT	INDICATION	NO.	PER CENT
Contracted pelvis	40	18.1	Impacted trans. present.	2	0.9
Placenta previa	33	15.0	High arrest of head	2	0.9
Dystocia	23	10.4	Pernie, naus. and vom.	1	0.45
Eclampsia	23	10.4	Abcessed kidney	1	0.45
Preeclamptic toxemia	18	8.1	Prolapsed cord	1	0.45
Prev. cesarean (cont. pelv.)	18	8.1	Antefixation of uterus	1	0.45
Prev. cesarean (indic. ?)	15	6.7	Tuberculosis, steriliz.	1	0.45
Abruptio placentae	5	2.2	Fibroid uterus	1	0.45
Dead babies (previously)	5	2.2	Herniated uterus	1	0.45
Deflexed attitudes	4	1.8	"Too large baby"	1	0.45
Unyielding cervix	4	1.8	Chronic lung abscess	1	0.45
Nephritic toxemia	3	1.3	Double uterus	1	0.45
Preservation perineorrhaphy	3	1.3	Desire to sterilize	1	0.45
Myocarditis	3	1.3	Desire to sterilize and repair		
Pulmonary tuberculosis	2	0.9	hernia	1	0.45
Fibroid obstructing labor	2	0.9	Not stated	3	1.35

Of the 58 women credited with contracted pelvis, it was found that 18, or 31 per cent had previously been delivered by cesarean section. Nineteen of the 58 women gave histories of one or more deliveries through the pelvis, resulting in loss of the baby. One death occurred in this group, a mortality rate of 0.55 per cent. This woman died of general peritonitis five days after the operation. The morbidity for this group was 27.6 per cent.

Twenty-two of the 33 women listed as having placenta previa were multiparas. In two instances the placenta previa was complicated by a contracture of the pelvis. In 75.8 per cent of the cases the women were not in labor at the time of the operation. Seventy-five per cent of the placenta previa group were eight or more calendar months pregnant. The maternal mortality for this group was 3.1 per cent. The fetal mortality was 21 per cent.

Under the heading "dystocia," is included all patients who the attendant decided would be unable to deliver through the pelvis. Probably the term "failure to progress" would be more appropriate, including both dystocia and inertia, because only a few charts gave the cause of the dystocia, or differentiated primary and secondary inertia. Twenty-three, or 10.4 per cent of the sections were performed under this indication, 16 of which were done after the women had been in labor thirty or more hours. Two women died as a result of the operation, a mortality rate of 8.7 per cent for the group. A morbidity rate of 78 per cent was the highest of all the groups.

Eighty-two per cent of the eclamptics were given advantage of consultation before the operation was performed. In no other group was consultation called in over 18 per cent, and this was in the placenta previa group. An effort was made to control the convulsions in 48 per cent of the women before the operation was performed. Primiparous women made up 95.6 per cent of the eclamptics. Four of these, two of whom were at term, had contracted pelvis. Eighteen, or 78.3 per cent of the eclamptics were not in labor. Emptying of the uterus stopped the convulsions in 78.3 per cent. One eclamptic patient died after the operation, a mortality rate of 4.3 per cent. Death occurred six days after the operation from general peritonitis. The fetal mortality was 35 per cent. The morbidity for this group was 48 per cent.

Eighteen, or 8.1 per cent of the operations were performed because of preeclamptic toxemia. Two-thirds of these women were primiparas, and 83 per cent of them were not past eight and a half calendar months of pregnancy. Contracture of the pelvis was listed as a complication in three charts, yet in all three instances the pregnancies were not beyond eight and a half months. The heaviest baby delivered of the three, weighed only 6 pounds and 12 ounces. Other indications, in addition to the toxemia, include: four women previously delivered by section; one polyhydramnion delivered of an anencephalic monster; in two charts, inertia was listed as a complication after the women had been in labor longer than twenty-five hours. It was found that 72 per cent of the preeclamptic patients were not in labor at the time of the operation. The mortality rate for the preeclamptic group was 5.5 per cent. The fetal mortality was 28 per cent. The morbidity was 55.5 per cent.

Of the previous abnormal deliveries, it was found that 14.9 per cent of the 220 women had been delivered previously by cesarean section,

one or more times, only 0.9 per cent of whom had been delivered by the low cervical type of operation. Thirty-three women had had previous cesarean sections, five of whom had had two sections each. Two women had previously been delivered by the low cervical operation. In 11 instances, the first baby had been lost as a result of a difficult forceps delivery, and 4 women had lost 2 babies each because of the same difficulty.

The following is worthy of emphasis: A primiparous woman had a spontaneous, normal labor, and delivery of a living baby at the end of gestation. She was delivered by forceps at the end of her second pregnancy and the baby was lost. A cesarean section terminated the third pregnancy because of the difficulty that had been experienced with the second. Another cesarean section was done at the end of the fourth pregnancy and the woman died of peritonitis.

Two women lost two babies each from difficult breech extractions. One woman had a rupture of the uterus during her first labor, losing the baby.

Of the women who had had previous cesarean sections, 17 were not in labor at the time of the second operation. Of the 16 who were in labor, 75 per cent were in labor less than five hours before the operation was again performed. In 4 instances, the scar of a previous section was subjected to the strain of labor between ten and twenty-four hours before another section was performed. Investigation has shown that the uteri of 4 of these 220 women ruptured during later pregnancies or labors. Three of the mothers and all of the babies were lost.

#### ADDITIONAL OPERATIONS

Sterilization was performed in 51 instances, or in 23.1 per cent of the series. Nine other women were left sterilized because of the Porro operations. Small subserous fibroid nodules were enucleated in four instances. The omentum was adherent to the scar of a previous section three times and required resection. There were two ventral hernias that were repaired following the operation. Unilateral ovarian cysts were removed in two women. An appendectomy was performed 7 times. Of the 51 women sterilized, including the 9 Porro operations, 20 women were made "one child mothers."

#### STERILIZATION

Twenty-three per cent of the women were sterilized at the time of operation. Thirty-four of the 51 women undergoing their first cesarean section were sterilized; 58 per cent of the women undergoing the second operation were sterilized; and 40 per cent of the women undergoing the third operation were sterilized. Thirty-nine per cent of the women sterilized, including the Porro cases, were primiparas. Contracted pelvis led the list as the indication for the sterilization of primiparas.

## PORRO OPERATIONS

The Porro operation was resorted to 9 times, and in 5 of these the women were primiparas. Three of the women were less than twenty-two years of age. The indications for removal of the uterus in primiparous women were as follows: infected uterus in 3 instances, and fibroids of the uterus in 2 instances.

## MATERNAL MORTALITY

Space will not permit the details of each maternal death; however, the important findings on the charts of women dying following cesarean sections are recorded in Table IV. Note the relation of mortality and ruptured membranes, and also that all of the women had vaginal manipulation or examinations before the operation. In 3 instances, additional operative procedures were carried out at the time section was performed. Note the incidence of general peritonitis following "speedy operations."

TABLE IV. MATERNAL DEATHS

INDICATION	T	P	B.O.W.	VAG. EXAM.	HOURS LABOR	ADDIT. OPERAT.	OPERAT. CAUSE TIME OF MINUTES DEATH	DAY OF DEATH
Prolapse of cord	N	N	Rupt. Time?	2	Not Stat.	None	33 Perito- nitis	9
Fibroid obst. labor	N	N	Rupt. 4 hr.	4	8 hr.	None	20 Perito- nitis	8
Cephalopelv. disp.	N	N	Rupt. 2 hr.	3	3 hr.	None	25 Perito- nitis	4
Previous dead babies	N	N	Rupt. Time?	2	Not Stat.	None	25 Perito- nitis	4
Inertia	N	90	Rupt. Time?	4	Not Stat.	Appen- dectomy	120 Perito- nitis	6
Previous cesarean	N	N	Intact.	1	Not in Labor	Steri- lized	42 Perito- nitis	4
Placenta previa	N	136	Rupt. 3 hr.	3	Not Stat.	None	44 Perito- nitis	4
Eclampsia	N	90	Intact.	1	Not in Labor	None	25 Perito- nitis	6
Preeclamp. toxemia	99	138	Intact.	1	Not in Labor	None	40 Pulmonary edema	12 hr.
Cephalopelv. disp.	N	N	Rupt. 5 hr.	2	18 hr.	None	38 Ether pneumonia	6
Inertia	101	106	Rupt. 15 hr.	1	40 hr.	Steri- lized	82 Septic pneumonia	31
Impacted trans. pres.	102	126	Rupt. Attem. Time? Vers.		Not Stat.	None	105 Metastatic bacteremia	21

## MORBIDITY

A temperature of 100.4° or over, occurring after the first forty-eight hours, was used as a standard for determining morbidity. The morbidity for the classical operations was 41 per cent; for the low cervical operations, 38 per cent. The febrile reactions include all intercurrent dis-



orders present, as it was impossible to obtain data explanatory for rises in temperature, due to many poorly kept progress notes. If immediate postoperative temperature elevations are included, the morbidity for the classical and low cervical operations is 59 and 66 per cent, respectively.

#### FETAL MORTALITY

Table V shows the details of the fetal deaths. Of the 225 babies delivered, including 5 sets of twins, there were 37 stillbirths and neonatal deaths, a fetal mortality of 16.4 per cent.

TABLE V. FETAL DEATHS

DEATHS ACCORDING TO INDICATIONS		CAUSES OF FETAL DEATHS	
	NUMBER	NUMBER	PER CENT
Eclampsia	8	Prematurity	20 54.0
Placenta previa	7	Toxemia	1 2.7
Abruptio placenta	4	Abruptio placentae	4 10.6
Previous cesarean	3	Ruptured uterus	1 2.7
Contracted pelvis	2	"Stillbirth"	1 2.7
Nephritic toxemia	2	Tentorial tear	2 5.4
Myocarditis	1	Cause not stated	5 13.6
Ruptured uterus	1	Diagnosed as dead before operation	3 8.3
Pulmonary tuberculosis	1		
Abscessed kidney	1		
Two previous dead babies	1		
Preeclamptic toxemia	5		

It is interesting to note that autopsy revealed the cause of fetal death in two instances as due to intraeranian bleeding, both of whom were delivered by classical section. It was also found that three known dead babies were delivered by section, not including the abruptio placentae cases. The fetal mortality in eclampsia was 34.8 per cent; in placenta previa, 21.2 per cent; in preeclamptic toxemia, 27.7 per cent; and in abruptio placentae, 80 per cent.

#### ANESTHESIA

Ethylene was used in 26.8 per cent of the cases; nitrous oxide in 21.8 per cent; drop ether in 20.4 per cent; local infiltration of novocaine in 9.6 per cent; and local infiltration of novocaine plus an inhalation anesthetic in 12.8 per cent. It was observed that when an inhalation anesthetic was administered longer than ten minutes before the operation was started, some effort to resuscitate the baby was necessary. This was particularly true when nitrous oxide or ether anesthesia was used.

The author wishes to express his appreciation to the operators and superintendents of the seven hospitals for the privilege of reviewing and reporting this material, and for their aid in making this study possible.

692 NORTH HIGHLAND AVENUE, N. E.

## PRIMARY OVARIAN PREGNANCY

### REPORT OF A CASE WITH DECIDUAL REACTION

A. M. YOUNG, M.D., AND G. M. HAWK, M.D., CLEVELAND, OHIO

(From the Laboratory Department and Department of Surgery, Mt. Sinai Hospital)

THE case of ovarian pregnancy presented here fulfils the four criteria prescribed by Spiegelberg<sup>1</sup> in 1878. The fetal sac is contained in part in the cavity of a corpus luteum suggesting that the ovum was fertilized within its own graafian follicle. The chorionic villi present are for the most part intact and decidual cells are found in locations similar to those in ectopic pregnancies elsewhere. The gestation sac contains a fetus 26 mm. long which is well formed although somewhat macerated.

Although several hundred cases of primary ovarian pregnancy have been reported, less than 100 are accepted as genuine by those analyzing the reports liberally while those using most rigorous criteria accept many less.

Williams<sup>2</sup> in 1917 accepted 41 cases as genuine ovarian pregnancies. Sutton<sup>3</sup> in 1924 in a careful analysis considered 47 cases as proven. Frank<sup>4</sup> in 1927 accepted 64 cases whereas Strezoff<sup>5</sup> in the same year accepted 92 cases. Wollner<sup>6</sup> in 1932 accepted only 48 as true and 39 as doubtful.

Of the cases reported only a small proportion have shown part or all of the placenta within the corpus luteum and even less frequently has a fetus been recognizable.

Ovarian pregnancies form only a small percentage of the total number of extrauterine pregnancies. During the last ten years at the Mount Sinai Hospital of Cleveland there have been 148 cases of ectopic pregnancy, all but three of which were tubal, paratubal or tuboovarian. Of the other three, one occurred in the cornu of the uterus, one was a case of doubtful ovarian pregnancy, possibly paratubal or tuboovarian, and the third, the case of ovarian pregnancy presented here. In this small series, true ovarian pregnancy formed approximately 0.7 per cent of the total number of extrauterine pregnancies.

The patient, M. Z., white, German, was admitted to the Mount Sinai Hospital of Cleveland, March 30, 1932. Last menstrual period Feb. 14, 1932, normal, painless. Beginning March 7, 1932, which was a week earlier than expected, the patient bled moderately for seven days. Following this there was no more vaginal bleeding. The patient at this time began to notice a mild nausea which was referred to her substernal region. There was no vomiting. Her breasts became firm and painful. March 25, 1932, she experienced sharp lower abdominal pain which disappeared an hour later. About

midnight, March 29, 1932, she experienced excruciating lower abdominal pain which rapidly extended upward across the abdomen and was referred to the subcostal region. She was nauseated but did not vomit and complained of thirst. The physician (G. M. H.) was called the following morning at 7:00 A.M.

The patient had an appendectomy for acute appendicitis twenty-five years ago in Germany. Eight years ago following the birth of her only child, she developed a high rectovaginal fistula.

On admission the patient showed definite anemia and apparently was in acute pain. The abdomen was distended and tender with shifting dullness. The cervix was soft, the fundus slightly enlarged and forward. Slight cervical movement produced much pain. An indefinite boggy mass was present in the culdesac. The heart and lungs were normal. White cells 8400, red cells 3,450,000. Hemoglobin 75 per cent. Urine normal. Preoperative diagnosis: Ruptured ectopic pregnancy.

*Operation:* On opening the peritoneal cavity a large quantity of blood escaped. Several large clots were also removed. A large, fixed mass was present in the right adnexal region. This was delivered with some difficulty as the right tube and ovary were firmly fixed deep in the culdesac. The right tube was elongated and showed obliteration of the fimbriated end. The right ovary was attached to the uterus by the ovarian ligament. It measured five to six cm. in diameter and contained a large hemorrhagic mass. A small fetus was present in this ovarian mass. The left fallopian tube, ovary, and uterus appeared normal. A right salpingo-oophorectomy; and left salpingotomy was performed. A postoperative diagnosis of right ovarian pregnancy was made. Convalescence was uneventful and the patient was discharged from the hospital April 8, 1932, ten days post-operative.

*Pathologic Findings.*—The specimen consisted of right ovary and tube. On reconstructing the ovary, it formed a roughly spherical mass measuring approximately 5 by 4 by 4 cm. Along the external surface of the mass, ovarian tissue was grossly recognizable with a characteristic corpus luteum measuring approximately  $2\frac{1}{2}$  cm. in long diameter, the collar of yellow lutein tissue measuring approximately 4 mm. in width. The corpus luteum overlay a mass of reddish brown friable tissue grossly suggesting placenta and blood clot which in part occupied the cavity of the corpus luteum. In the central portion of the mass of placental tissue was a fetal sac about 3 cm. in diameter lined by smooth transparent membranes. The fetus was separate from the sac and was well-formed although somewhat macerated. It measured 26 mm. crown rump length and 26 mm. full length, these measurements corresponding to those of a fetus (in the uterus) of fifty to sixty days' pregnancy. In addition to the corpus luteum mentioned above, ovarian tissue was recognizable elsewhere on the external surface of the mass with a few small follicular cysts and corpora fibrosa recognizable on section. A portion of the ovarian ligament was present attached to the intact ovarian tissue.

The fallopian tube was entirely separate from the ovarian mass and measured approximately 7 cm. in length, a few times average short diameter (12 mm.) in distal portion and 5 mm. diameter in proximal portion. The distal opening was obliterated with the fimbriae not recognizable. The serosa of the fallopian tube was thickened and covered by a number of tags of fibrous tissue. On repeated section the lumen was moderately dilated in the distal half, no blood visible. The wall of the tube was thinner than average in the distal portion, firm, grayish white throughout.

Sections of the ovary showed characteristic lutein cells along the external surface. The cavity of the corpus luteum was filled with blood clot, with scattered chorionic villi, some intact, others degenerating. The intact villi were character-

istically those of early pregnancy, being coarse with small blood vessels containing nucleated red blood cells. In the region of the chorionic villi and about vascular slits along the inner surface of the corpus luteum there were islands of large cells with abundant cytoplasm (typical decidual cells). There were also a number of apparently involuting decidual cells in similar locations.

Frozen sections stained with Scarlet R and hematoxylin showed no orange-stained masses in the decidual cells while the regional lutein cells in the same

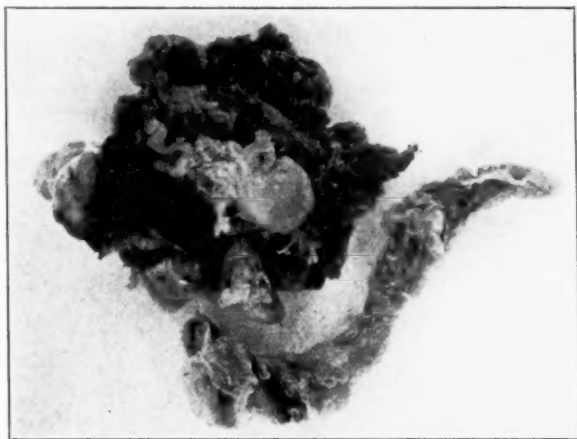


Fig. 1.—Gross photograph. Ovarian pregnancy showing corpus luteum in wall of gestation sac and fallopian tube separate from ovarian mass.

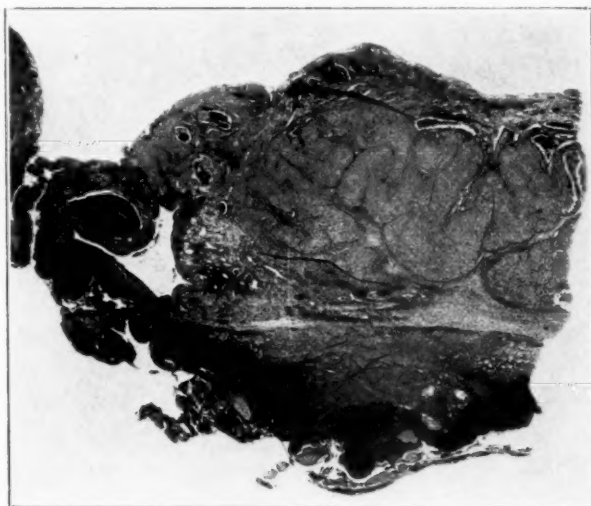


Fig. 2.—Photomicrograph. (Very low magnification). Ovarian pregnancy showing corpus luteum, chorionic villi, and portion of ovarian ligament.

sections showed numerous such colored granules uniformly distributed. There was a layer of organizing blood clot between the collar of lutein cells and the gestation sac, with a number of fibroblasts and macrophages containing orange to red globules apparently lipid particles. In places the trophoblasts covering the chorionic villi contained orange-stained droplets, these villi apparently degenerating.

of Williams,<sup>12</sup> Polak and Wolfe,<sup>13</sup> Kline<sup>14</sup> and others in their observations on the decidual reaction in extrauterine pregnancies. Kline in a careful study of 74 cases of tubal pregnancy states: "In a study of 74 cases of extrauterine pregnancy, evidence was found for the belief (1) that a decidual reaction of greater or less extent occurs constantly at the site of implantation; (2) that the decidual tissue persists as long as the chorionic villi are intact; (3) that following the termination of the pregnancy by hemorrhage with resultant degeneration of the chorionic villi, the local decidual tissue undergoes involution, and (4) that a distant decidual reaction in other portions of the tube, uterus, or elsewhere is not constant and that when it does occur, it may persist after the degeneration of the chorionic villi and the complete involution of the local decidual tissue."

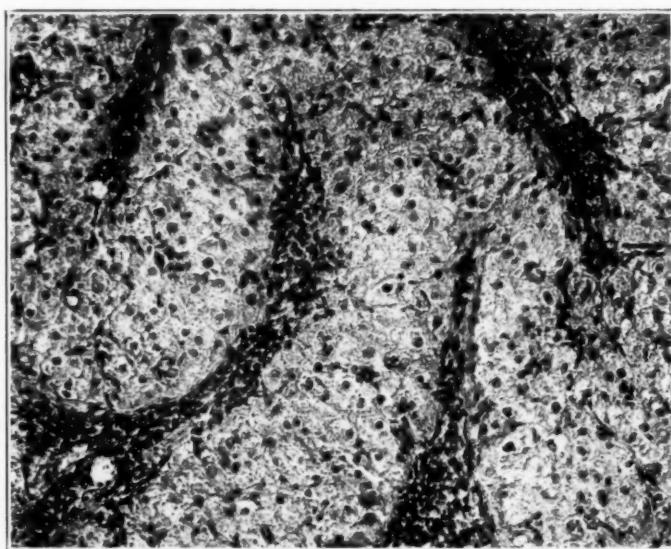


Fig. 5.—Photomicrograph. (High magnification). Corpus luteum showing fine granules in lutein cells. (Scarlet R and hematoxylin stain.)

In view of the observations in tubal pregnancy it seems probable that those who observed decidual or decidua-like cells in ovarian pregnancy observed cases in which the ovarian pregnancy was relatively intact, while those who found no evidence of a decidual reaction observed cases in which the pregnancy was degenerating or degenerated and consequently associated with involuting or involuted decidual cells.

There are several theories relating to the causation of primary ovarian pregnancy, all, however, agreed that two conditions must be postulated; first the ovum must be retained in its follicle and second the spermatozoon must gain access to the follicle.

It seems highly probable that retention of the ovum in the follicle occurs much more frequently than does ovarian pregnancy. In addition to lessening the expulsive power of the ovary slight variations in the re-



sistance of the follicular wall, such as may be produced by small bands of fibrous tissue following inflammation, may determine lines of force resulting in propelling the ovum against the wall of the follicle rather than through the orifice.

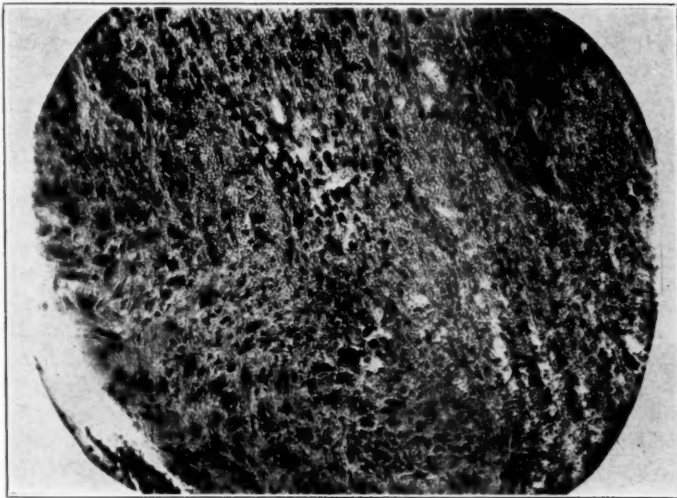


Fig. 6.—Photomicrograph. (High magnification.) Ovarian pregnancy showing decidua cells, phagocytic cells and lutein cells. (Scarlet R and hematoxylin stain).

The infrequency of ovarian pregnancy is probably in great part due to (a) infrequency of follicular retention or expulsion into the ovarian stroma of ova, and (b) unfavorable conditions for the penetration of spermatozoa through the follicular orifice.

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## CARCINOMA OF THE CERVIX IN A GIRL OF SIXTEEN

MORRIS GLASS, M.D., BROOKLYN, N. Y.

*(From the Department of Obstetrics and Gynecology of the Long Island College Hospital)*

MISS C. K., aged sixteen, was admitted to the Long Island College Hospital on August 19, 1927, complaining of a purulent vaginal discharge. The family history was irrelevant. At the age of four the patient had "congestion of the brain," and since has had a residual speech defect with retarded mentality. At the age of eight, tuberculosis of the right knee required surgical incision and cast was followed by a permanent ankylosis. Menstruation began at fifteen, recurred at irregular intervals of three to twelve months and lasted two to three days. The last period occurred June, 1927. The present illness began one year ago, with a foul purulent vaginal discharge which lasted for two months and then spontaneously subsided, only to recur in March, 1927, and has persisted in spite of vaginal irrigations. For two weeks prior to admission the discharge had been very profuse. The general physical examination was entirely negative except for ankylosis of the right knee joint. The laboratory data were essentially negative. Vaginal smears were found negative for gonococci.

On August 20, vaginal examination performed under gas oxygen anesthesia revealed a large cauliflower mass involving the entire cervix and filling the vagina. A biopsy was taken.

The report of the Gynecological Laboratory follows: Specimen was comprised of large tissue fragments which were granular, opaque, and suggestive of malignancy. Microscopically, the majority of the fragments presented a uniform picture. They were comprised of tumor cells divided into large and small alveoli by bands of hyalinized connective tissue (Fig. 1). Edema and hydropic degeneration were prominent characters. The constituent cells were sharply defined. The cytoplasm was faintly acidophilic and granular. The nuclei were round or oval in form, vesicular in type with moderate increment in chromatin contents. As a rule they were centrally placed. Variation in size, shape, and staining characters was not prominent. In an occasional fragment, however, small irregular gland spaces were reproduced (Fig. 2). These were lined by low columnar cells with scant cytoplasm. The round and oval nucleus practically completely filled the cell body. Where secretion had occurred, the lining cells had been compressed, and only the small flattened or ovoid nuclei were retained. Diagnosis: Embryonal carcinoma of the cervix. Comment: Appearance of epidermoid and adenocarcinoma was in conformity with derivation of glandular and epidermoid epithelium from embryonal müllerian elements in the cervix.

On August 25, under ether anesthesia, the cervical growth was excised by the cautery and 75 mg. of radium inserted in the cervical canal for twenty-four hours. The patient was discharged Sept. 16, 1927, as clinically improved. In the interval between Sept. 12, 1927, and Sept. 18, 1929, a series of 17 deep x-ray treatments were administered.

Numerous follow-up examinations were made after discharge from the hospital until Aug. 10, 1930. At all times the patient was free from vaginal discharge or bleeding. No traces of tumor were noted in the cervix. The parametria were found free from induration. Frequency of urination was a persistent complaint.

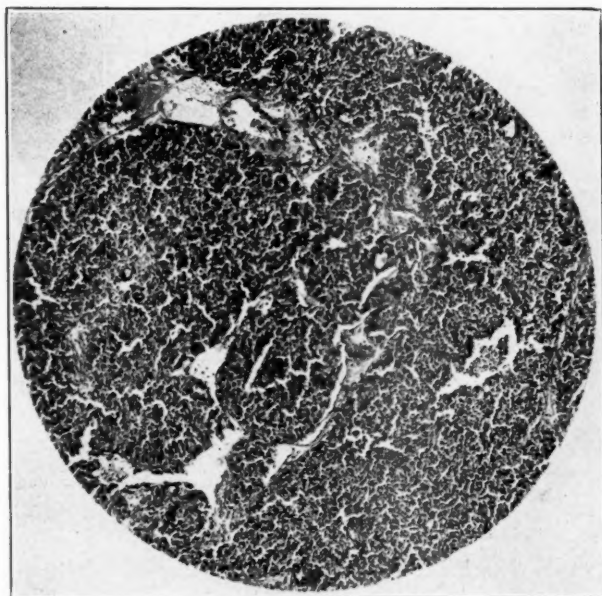


Fig. 1.—Biopsy from cervix shows a medullary and alveolar arrangement of tumor cells. Cytoplasm is scant. Buds well defined. Nuclei are centrally placed.

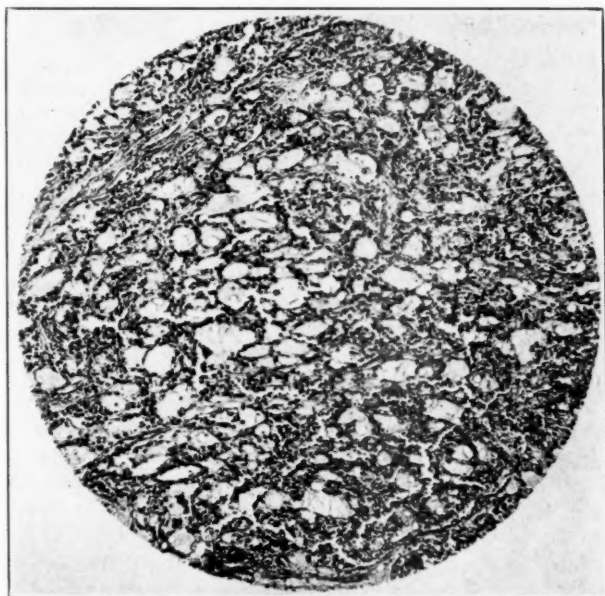


Fig. 2.—Biopsy from cervix. Differentiation of tumor cells into gland spaces. The lumen is wide and filled with secretion. The lining layer is low. Alveolar formation is also noted.

On October 21, 1930, patient complained of a poor appetite and a feeling of cold. This persisted until October 31, when pain appeared in the left shoulder and chest. Pain was not severe but was associated with a dry hacking cough. On November 2 patient became acutely ill, felt very weak and feverish. She was admitted to the Medical Service of the Long Island College Hospital with a temperature of 103°, pulse 112, respiration 30, the diagnosis was pneumonia in the left upper lobe.

In the interval between admission and her death at 6:15 P.M., November 9, physical findings, symptoms, and laboratory data remained relatively unchanged.

The condensed report of the autopsy performed by Dr. M. Rosenthal is as follows: The body was that of a young adult female. The contour was definitely masculine with hair distributed over the face and abdomen. A brownish pigmentation was noted over the thorax, upper and lower extremities. Emaciation was marked. Two oblique scars were noted above the right knee. Head and neck were essentially negative. During

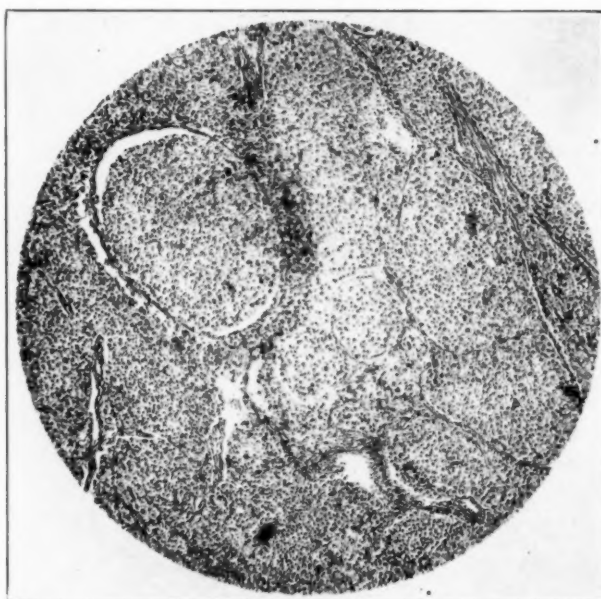


Fig. 3.—Pulmonary metastases. Tumor cells arranged in definite alveoli. Note sharply defined cell membrane, abundant cytoplasm and centrally placed nucleus. The tumor cells are reminiscent of epidermoid carcinoma.

removal of the left lung an abscess cavity was evacuated in the lower half of the upper lobe. On cross-section the apex of the left lung presented a gelatinous pneumonia. The left upper lobe itself was the seat of conglomerate tumor masses, varying from 1 to 30 mm. in diameter, reaching from the hilum to the pleural surface. Compression of the left main bronchus resulted in it being filled with mucus. Below the site of obstruction and involving the lower segment of the upper lobe, areas of bronchopneumonia with abscess formation were prominent. The lower lobe of the left lung presented several tumor nodules and scattered areas of bronchopneumonia. The right lung presented passive congestion and emphysema. The apex, however, contained a tumor nodule 1½ cm. in diameter. The heart, liver, spleen, kidneys, and gastrointestinal tracts were essentially negative.

Microscopically: Sections from the left lung revealed the tumor nodules arranged in irregular alveoli sharply defined by narrow connective tissue septa (Fig. 3). The component cells were round, oval in shape with a sharply defined cell

membrane and abundant granular cytoplasm. Hydropic degeneration was frequent. Variation in size, shape, and staining capacity were everywhere in evidence. Giant nuclei were not uncommonly noted. Similarity to the cells of the biopsy specimen was striking.

Section from the lower half of the lung revealed suppurative pneumonia. The right lung presented compensatory emphysema. The liver, kidneys, and spleen were essentially negative except for cloudy swelling.

The uterus was markedly atrophic, measured  $4\frac{1}{2}$  cm. from cervix to fundus, 32 mm. transversely at the level of the round ligaments and  $1\frac{1}{2}$  cm. in the anteroposterior diameter at the same level. The cervix comprised fully half the total length of the organ. The portio was smooth, covered by a normal squamous lining. The external os was round. On incision the arborae vitae were well demonstrated. The fibromuscular wall measured 8 mm. in thickness and was grossly fibrotic. No malignant tissue was apparent to the naked eye. The mucosa of the body and fundus was thin and congested. The muscular coat presented advanced atrophy and measured 6 mm. in thickness. The serous coat was normal. Multiple sections taken from the cervix, uterus, tubes, and ovaries revealed, microscopically, changes due to radiation atrophy with no evidence of residual carcinoma in the cervix or in any of the contiguous viscera.

Summary: A proved case of carcinoma of the cervix in a girl of sixteen. The constituent tumor cells showed differentiation into epidermoid carcinoma with areas of adenocarcinoma, thus simulating müllerian development into epidermoid and glandular epithelium. The onset with persistent vaginal discharge and findings of a cauliflower growth were characteristic. Excellent local response to radiation was observed for three years. Death ultimately followed as the result of pulmonary metastases and purulent bronchopneumonia. Postmortem study of the uterus and adnexa showed radiation changes. There was no trace of residual carcinoma.

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159 CLINTON STREET.

#### Paramore, R. H.: A Case of Eclampsia Treated With Spinal Anesthesia, *Lancet* 219: 399, 1930.

In two previous patients spinal anesthesia seemed highly efficacious in stopping the eclamptic convulsions, but in this case the fits recurred. This individual had had omnopon and intermittent chloroform until spinal anesthesia could be given. Hot baths and enemas were supplemented after recovery seemed likely, but the eclampsia recurred in three days. Cesarean section and an incision of the right renal capsule under chloroform anesthesia were unsuccessful in terminating the disease. Twenty hours after the operation the second spinal anesthesia was administered, yet the last convulsion was eight hours later or twenty-eight hours after delivery.

Chloroform and omnopon had been liberally used to control the convulsions.

Even though it was not used in this patient, venesection is recommended for those having a small blood loss at delivery.

The infant did not survive. The patient left the hospital on the twenty-first day with slight albuminuria, and the loin incision healed.

H. C. HESSELTINE.



## A CASE OF TUBAL TWINS\*

WILLIAM AVERILL JEWETT, M.D., BROOKLYN, N. Y.

(From the Department of Obstetrics and Gynecology, Long Island College Hospital)

IN MARCH, 1923, Arey published in *Surgery, Gynecology and Obstetrics* a critical summary of all the then existing cases of tubal twins to be found in the literature. He recorded 40 cases that were positive or authentic, eight that were probable, and four possible but doubtful. Since the publication of this report I have been able to find nine other cases that seem to be definite which, with the case I wish to report at this time, would add ten more to the record. In the article referred to, a brief description of each case was given. A similar description of the new cases follows:

1. Kynoch, 1924. Tubal twin pregnancy. Six weeks' amenorrhea before operation. A large paratubal hematocoele communicating with a swelling of the right tube. Pathologic report: "Tubal mole containing two embryos."

2. Harrar, 1927. Interstitial twin pregnancy with intraligamentous rupture, later becoming abdominal. One of the twins succumbed at the third month and was well on its way to become a lithopedion five months later. The other lived for seven and a half months until the rupture of the sac intraabdominally.

3. Paschal, 1927. Bones of two fetuses removed per rectum ten years after a pregnancy without delivery. A presumed case of an abdominal pregnancy with death of fetuses and years later ulceration of the bones through into the rectum.

4. Cutore, 1929. Twin tubal pregnancy with one chorion and one amnion. A multipara who had never had an abortion; last pregnancy eleven years ago. Sudden onset of abdominal pain forty-five days after her last period. At operation the left tube was found the seat of an ectopic gestation which on section was found to contain two embryos each about 19 mm. long, in a single amniotic cavity. One was normal and the other an exencephalus. There was a thin permanent fold present which may have been the remains of a partition between the two fetuses.

5. Nota, 1929. Left tuboovarian mass removed at operation. Pathologic report: "an ovid tumor 10 by 8 cm. unruptured." On section the cavity was lined with membrane resembling amnion. Two fetuses 62 mm. and 60 mm. long, about two months' gestation, were found, each had an umbilical cord inserted into a single placenta.

6. Deichgraber, 1931. A ruptured tubal twin pregnancy at six months. Fetuses about 30 cm. long each in its own amniotic sac were found in the abdominal cavity. The sacs were intact. The tube was ruptured and about half the placenta was outside the lumen partially attached to the omentum.

7. Tixier, 1931. Tubal twin pregnancy in a patient with uterine fibroid. At operation the tube was found ruptured with intraabdominal bleeding "grasping the tube with the hands expelled a placenta to which two small fetuses were attached." History is incomplete. Patient had no skipped period but had had continuous bleeding for six weeks before the operation. No pathologic description of the tube, placenta, or embryos.

8. Franchini, 1931. Twin abdominal pregnancy primarily tubal. Operation four months after the last menstruation. A sac containing two viable male fetuses about

\*Presented to the Obstetric Section of the Academy of Medicine, December 23, 1932.

four months old; each fetus attached by a cord to a single placenta adherent to the left side of the uterus in the culdesac and to the rectosigmoid. The fetuses were 20 cm. long and weighed 185 and 200 gr.

9. Bocquentin et Bruneton, 1932. Two months' amenorrhea preceded the onset of severe abdominal pain with vaginal bleeding, tendency to faint, etc. At operation left tube was dilated near the isthmus and had ruptured posteriorly. Examination of the specimen removed showed placental remains attached to the wall of the tube and two embryos  $1\frac{1}{2}$  cm. long, each attached by cords 3 cm. long to the same point in the placenta. Each within its own amniotic sac.

In analyzing the reports of all of the authentic cases, I find that one-half of them had advanced to between the sixth and twelfth week of gestation, and but one-fifth (20 per cent) had been of six weeks' duration or less. Of the nine early cases four had had rupture of the gestation sac, four were unruptured, and one not recorded.

Mrs. A. W., admitted to my private service on March 20, 1931. A white nullipara aged thirty-five.

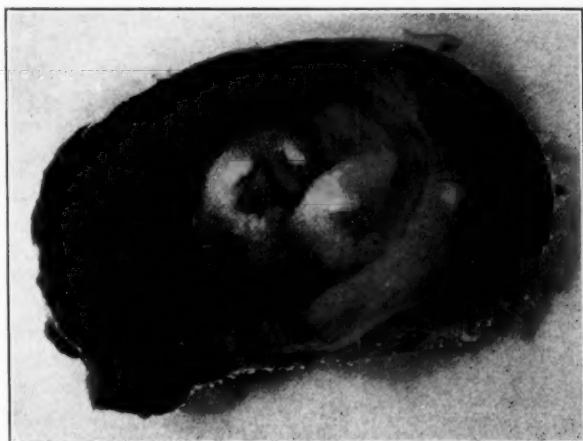


FIG. 1.

Her menstrual history was normal. She had been married thirteen years and had 3 induced abortions with no complications.

Last regular period on Jan. 26, 1931, perfectly normal in every respect. Missed her February period, and on March twelfth began to have very slight, serosanguinous brownish spotting. On March fifteenth in the afternoon, patient had an attack of acute colicky pain in lower abdomen but felt better on going to bed. Next day when she arose was again seized with similar attack of pain. Since then spotting has continued as since onset and the pain returns when patient has been on her feet for several hours. Has not passed any clots or anything resembling products of conception. An enema caused pain throughout the abdomen. General condition very good. Had no nausea or vomiting at any time.

Pelvic examination showed a nulliparous introitus. No external evidence of infection. Cervix low, points forward, no marked pain on motion. Uterus incompletely retroverted. Adnexa prolapsed into culdesac. More tenderness on right than left. Diagnosis: Ectopic gestation.

Operation: March 21, 1931, partial right salpingectomy.

Vaginal examination was done under anesthesia. The cervix was long and the external os closed. The fundus was not enlarged but was retroverted with a mass fixed in the culdesac.

The abdomen was opened in the lower midline. A small amount of free blood was found in the peritoneal cavity. The adnexa was lightly adherent to the culdesac. The right tube at about  $1\frac{1}{2}$  cm. from the fimbriated extremity was enlarged 3 cm. The right ovary and left adnexa were both normal.

The outer third of the right tube was removed without disturbing the ovarian circulation.

The appendix was examined and found normal and not removed. The peritoneum was freed from blood and the wound closed in layers without drains.

Discharged in excellent condition April 5.

Pathologic Report: The tube presented an oval swelling which measured 3 by  $2\frac{1}{2}$  by 2 cm. The serosa over this mass was attenuated, with small areas of hemorrhage beneath the surface. On section, through the ectopic site, a well-defined amniotic cavity was found. From its anterior aspect arose the umbilical cords of a twin pregnancy. The embryos measured 11 mm. in length and were normally formed.

Microscopically the lining mucosa of the tube was retained. Pregnancy almost completely filled the tube lumen. The amnion was preserved, likewise the chorion laeve and chorion frondosum. The villi, however, presented areas of mucoid degeneration. The pseudo capsularis formed by the reflecting tubal mucosa was well preserved. Muscle coat thin and atrophic. Edema was prominent, serosa congested.

380 VANDERBILT AVENUE.

## KRAUROSIS VULVAE

(GEORGE JOHNSON, M.D., WILMINGTON, N. C.)

CASE 1.—Mrs. T., thirty-three years of age, was first seen on May 28, 1930.

She had one child twelve years old and no abortions. Her complaints consisted of frontal headaches, nervousness, hot flushes, and pain in the lower part of her back, worse during the menses. Leucorrhea had been present since her child was delivered. There had been intense itching of the vulva for the past three years, which was great enough to awaken her at night. Her menses were regular, scanty, with pain before and during the flow. Physical examination showed a well developed, moderately obese white female. Her blood pressure was 168/74. The vulva was thick, leathery, whitish in color and presented signs of being scratched. The labia majora was flattened and the labia minora was small, thick, and inelastic. The clitoris was present but was small and leathery with a fissure to the left. The diseased tissue extended from the beginning of the mons veneris to the outer border of the labia majora and nearly to the anus. There was a clear-cut line of demarcation between the diseased and normal tissue. The urethral and vaginal mucosa appeared normal. The area that seemed most involved was the clitoris, labia majora, and fourchette, or where the fourchette should have been. The perineum was badly torn. The uterus was normal in size and shape but the cervix was lacerated and eroded. The treatment consisted of cauterization of the cervix, application locally of one dram of crude coal tar to one ounce of Lassar's paste and administration internally of ovarian emplets. The endocervicitis cleared very rapidly with cauterization and the leucorrhea was

lessened, but the severe pruritus continued. After nearly seventeen months of treatment and much persuasion she decided to undergo operation. On Oct. 7, 1931, under avertin and ether anesthesia, she had a vulvectomy, perineal repair, and appendectomy. She made an uneventful recovery except that she had to be catheterized for ten days following the operation. She had a slight return of the itching in the region of the mons, but the tissues appeared normal and I believe this to be of no consequence. The sexual act is satisfactory with response and she is delighted with the results from the operation.

CASE 2.—MRS. B., a widow, fifty-five years of age, was first seen on Oct. 20, 1930. She had five children and no abortions. Her complaints were nervousness, hot flushes, palpitation, weakness, leucorrhea, and a vaginal irritation for the past few years. Her menstrual history was essentially negative and she had passed through the menopause five years before. Physical examination showed a well developed, well nourished white adult female. Her tonsils were infected. Her heart was fast and irregular but there were no murmurs. Her blood pressure was 200/110. The reflexes were exaggerated. Her urine contained a trace of albumin and a few hyaline casts. The vulva was whitish, thick, leathery, and presented some signs of scratching. The same area was involved as in Case 1, except in this case the process extended more around the anus and involved a hemorrhoid next to the perineum. There were fissures about the fourchette and on the right side of the labia majora there was a small elevated whitish plaque. The labia minora in this case were well developed and not very much involved. The perineum was lacerated and the cervix was lacerated and badly infected. The pelvis was negative except for an atrophic uterus. Remembering the experience with Case 1, she was told that probably she would have to have the diseased tissue removed which she was reluctant to do. The cervix was treated with endothermy and the leucorrhea improved, but the pruritus remained unchanged. After her tonsils were removed, the general condition improved, her blood pressure returned to normal and her urine became normal. After observation and treatment for a year, an excoriation appeared on the labia majora that would not heal. It was so sore that she could not scratch it, and the salves that had been given her for the pruritus burned her to such an extent that she could not use them. This excoriation had a firm base not unlike that of a syphilitic ulcer. After explaining to her that this might be a beginning malignancy, she consented to an operation. On Nov. 10, 1931, nearly thirteen months after she was first seen, she was operated upon under avertin and ether anesthesia. A complete vulvectomy, perineal repair, and removal of the anterior hemorrhoid were done. She was kept under the influence of barbituric acid preparations for the first four days. She voided the fourth day and except for a mild pyelitis, she made an uneventful recovery. All the pain left her on the tenth day, and on the twelfth day she could sit comfortably.

NORTH CAROLINA BANK BUILDING.

## COMBINED PREGNANCY

H. D. LAFFERTY, M.D., PHILADELPHIA, PA.

(From the Department of Obstetrics, Hahnemann Medical College and Hospital)

**C**OMBINED pregnancy is that condition ensuing when nidation and growth of fertilized ova occurs simultaneously in and outside of the uterine cavity.

L. G., a white Italian, aged thirty-two, was referred to the hospital on Jan. 8, 1932, complaining of vaginal bleeding and crampy abdominal pain. There was no history of twin pregnancy in the family. The patient had typhoid fever at the age of thirteen, and an appendectomy was performed at the age of fifteen. Her menstrual periods began at the age of thirteen, occurring regularly every thirty days, with a fairly profuse flow lasting from six to seven days associated with some pain. She spontaneously delivered three full-term children, the puerperia being normal. The last pregnancy was six years ago. Ten years ago she was curetted for an incomplete abortion. The last menstrual period occurred Nov. 16, 1931. She admitted the taking of quinine to produce an abortion. A brownish vaginal discharge was first noted on Jan. 3, 1932, and five days later she began to note cramp-like abdominal pains, and hospitalization was advised. Upon admission the temperature, pulse, and respiration were normal. The patient complained of very little pain, and there was a very small amount of vaginal discharge. The abdomen presented a resistance just above the symphysis pubis. Vaginal examination revealed the physical findings of early pregnancy, but with an enlargement of the uterus greater than the period corresponding to the pregnancy, the uterus apparently being irregular. A diagnosis of a threatening abortion in a fibroid uterus was made. On Jan. 14, 1932, a Friedman test was positive, Hb 81 per cent, leucocytes 7600. She was observed until January 20, at which time the abdomen was investigated under nitrous oxide-oxygen-ether anesthesia, the plan being to perform a supravaginal hysterectomy because of the supposed fibroid complicating pregnancy. The right tube and ovary appeared normal. The left tube contained a pregnancy with impending tubal abortion. Examination of the uterus showed it to be symmetrically enlarged, and palpation gave the sensation as though there was an associated intrauterine pregnancy. A normal postoperative course followed except on the fifth postoperative day there was a rise of temperature to 103.2° with symptoms and physical signs of a pyelitis. This temperature dropped to normal and the patient was symptom free in twelve hours. On Jan. 26, 1932, a Friedman test was still positive. The patient had no vaginal bleeding from the time of operation until the evening of the twenty-seventh, one week postoperative, at which time there was vaginal bleeding, abdominal pain, and she expelled a three months' fetus and secundaries completely. The convalescence was uneventful, and she was discharged fifteen days after operation. The pathologic report showed a tubal pregnancy, fetus intact, follicular cysts of ovary.

The possibility of a combined pregnancy should be borne in mind especially in cases diagnosed as extrauterine pregnancy. At laparotomy for extrauterine pregnancy, both ovaries should be inspected, and the finding of two corpora lutea should raise the question of an associated intrauterine pregnancy. Care should be used in the handling of the pregnant uterus, and in the postoperative treatment, for a fair percentage of the cases go on to term, and deliver normally.



## TRAUMATIC RUPTURE OF THE LIVER AND KIDNEY WITH EVISCERATION, COMPLICATING PREGNANCY

W. F. GEMMILL, M.D., F.A.C.S., AND T. A. MARTIN, M.D., YORK, PA.

*(From the York Hospital)*

THE following case report demonstrates the possibility of recovery even when multiple organs are traumatized and ruptured in the presence of a complicating pregnancy.

Mrs. G. B., aged twenty-six, was admitted to the York Hospital following an automobile accident, the chief symptoms being pain, bleeding, and moderate shock.

Examination of the case in the emergency room showed a large transverse, ragged wound about 8 inches in length in the upper right quadrant with the major portion of the intestines hanging out on the bed linen. In addition there was a large laceration across the upper and right lateral part of the liver extending down to the fossa of the gall bladder but with no injury to the gall bladder or associated structures. The major portion of the right lobe of the liver protruded from the wound and two pieces of the liver approximately 2 by 3 inches were lying loose in the abdomen. The handle of the car door was found loose in the abdomen surrounded by omentum.

Further examination showed a pregnant uterus of about seven months' duration.

On the left cheek was a punctured wound. On the right side of the face a laceration extended from the angle of the mouth to the hair margin of the frontal region, across the scalp to the right of the median line, and turning distally at the parietal eminence to end above the right ear.

The patient's pulse was 110 per minute and the blood pressure 85/46.

The patient was transferred to the operating room by carefully wrapping the entire body in a sheet in order to prevent further evisceration and trauma to the exposed abdominal organs.

The intestines were cleansed with normal salt solution and the operating table turned in the left lateral position, thus aiding in the reduction of the herniated viscera. There was no rupture of the intestines noted.

The bleeding was controlled by sutures approximating all of the numerous lacerations of the liver and one section of the right lobe weighing 300 gm., being held only by a small pedicle, was entirely removed. The raw liver edge was sutured with catgut.

The right kidney was torn transversely from its medial to its lateral border involving the capsule and the kidney parenchyma but not extending into the calices. The bleeding from the kidney was profuse but was readily controlled by placing several deep sutures through the capsule and kidney substance.

Drainage was established by placing two cigarette drains between the pregnant uterus and the right lateral abdominal wall, the distal ends protruding through a stab wound close to Poupart's ligament. Likewise two drains were placed through a stab wound in the loin for dependent drainage. Because of the tendency to ooze from the raw liver substance seven large cigarette drains were placed in the subhepatic space, circularly arranged so as to include a large gauze pack. The ends of the abdominal wound were closed by suture.

The x-ray examination of the skull did not demonstrate a fracture. The examination of the catheterized urine was macroscopically clear but microscopically a few red blood cells were seen. Frequent subsequent examinations of the urine demonstrated a few red blood cells until the thirteenth postoperative day.

A blood count showed red blood cells 3,500,000, white cells 7,200, hemoglobin 50 per cent (Dare).

On the third postoperative day the patient was delivered of a seven months' fetus. Otherwise her convalescence was uneventful and at no time did the temperature rise above 101° F. or the pulse rate exceed 130 beats per minute.

After forty-six days of hospitalization the patient was discharged being in good physical condition and the abdominal wounds healed.

135 EAST MARKET STREET.

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## AN INEXPENSIVE LIGHT FOR DELIVERY OR OPERATING ROOMS

W. C. DANFORTH, B.S., M.D., F.A.C.S., EVANSTON, ILL.

(From the Department of Obstetrics and Gynecology, Northwestern University)

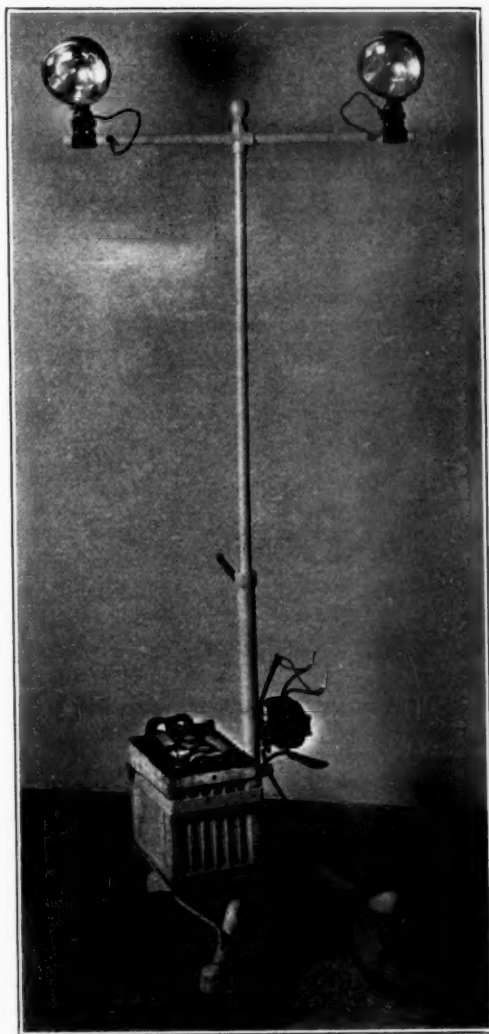
**I**N THESE days of financial stress, when all hospitals are finding it difficult to meet their operating expenses, the provision of new equipment becomes a problem. The staff dislikes to ask for anything which is not absolutely needed, and hospital administrative officers, who are usually anxious to provide all necessary equipment, in many cases, have all they can do to find funds for food, help, and fuel. Any suggestion which aids in meeting this problem, and which may at the same time make it possible to purchase new appliances, is of value.

Two lamps were recently made for two of the delivery rooms of the Evanston Hospital. The entire cost of materials for the construction of both of these lamps was \$19.00. No charge for labor is included. We are indebted to Mr. William Hendrey, chief engineer of the Hospital, for the ingenuity which resulted in their construction. The work was done by one of his engine room staff and most of the materials were parts of previously discarded pieces of equipment, supplemented by a small amount of gas piping. In addition to these items, there were required for each lamp two lamps such as are used for "spot lights" on automobiles, and which were obtained from a dealer in automobile supplies, a current converter to change the city current to one which could be used in lamps such as are described, a few feet of electric cord with a plug, and, for one of the two lamps, a small automobile storage battery to which the wiring might be attached in case of failure of the city current.

The spot lights are pivoted so that they may move in any direction. They may both be made to shine on the same spot, or they may be used singly. For illumination high in the birth canal the brilliant light which they afford is very useful.

The lamp carrying the emergency storage battery is shown in the illustration. This is carried on a simple rack made of flat strips of iron.

No complicated arrangement of switches is required. The wires from the current converter are joined to those of the cord leading through the center columns to the lamps by adhesive tape. Should the current fail, it requires but a moment to remove the tape and to attach the wires leading to the lamps to the battery.



(E. L. Ray, Evanston, Photographer.)

Fig. 1.—A simple and inexpensive lamp showing automobile storage battery, current converter, wires from which are joined to lamp wires by tape, and automobile spot lights.

For convenience in handling the lamp, the battery is usually removed and kept in an immediately accessible place near the delivery rooms. It must, of course, receive the care which such batteries require if it is to be of use when needed.

636 CHURCH STREET.

## EPILEPSY ASSOCIATED WITH OVARIAN DYSFUNCTION TREATED BY IRRADIATION

IRA I. KAPLAN, B.Sc., M.D., NEW YORK, N. Y.

*(From the Gynecological Service and the Radiation Therapy Department,  
Bellevue Hospital)*

SO OFTEN do we find it reported in the literature that irradiation has produced favorable results in cases failing to respond to the usual therapeutic procedures, that it has come to be a matter of course, when other means of alleviation fail, to treat such intractable cases with x-ray or radium therapy.

Recently Wieser in his review of the subject of epilepsy and radiation stated that irradiation is of benefit in traumatic, but of doubtful value in genuine epilepsy. On the other hand Witzleben reports that irradiation of the skull is a failure.

While functional uterine and ovarian disturbances are at times associated with cranial lesions, particularly when the pituitary is involved, epilepsy associated with metrorrhagia is rare. Jelliffe does not mention any connection between epilepsy and gynecologic conditions. Schon has stated that 50 per cent of epileptic seizures arise in puberty, and are aggravated during menstruation, the menopause, and sometimes during pregnancy. He believes that in all such cases disturbances of the endocrine system are present. According to Hirst, epilepsy is a rare complication of pregnancy, and patients subject to this disease are usually free from its manifestations during pregnancy, but become again subject to the attacks during the puerperium and with the reappearance of menstruation. No mention of it at all is found in the gynecologic works of Dudley or of Eden and Lockyer. In his study on menstruation in relation to mental disorders, Healy states that epilepsy may occur with the first menstrual period and appear regularly thereafter but ceasing with the menopause. Two such cases were cured by removal of the ovaries. Other gynecologists have observed that epilepsy is less marked after the menopause, and accordingly irradiation has been suggested for advancing the menopause, so that by suppressing the menstrual function the epilepsy would be controlled. MacKinnon reports a case of a young girl cured of epilepsy and an associated goiter condition by oophorectomy.

The case herewith reported presents an instance of metrorrhagia associated with epilepsy, which has apparently been cured over a period of five years, following suppression of the menses by x-ray therapy.

M. G., aged twenty-eight, single, was admitted to the Gynecological Service at Bellevue Hospital May 9, 1927, complaining of persistent vaginal bleeding for five weeks, weakness, epilepsy, and rheumatic pains. In 1923 she had a tonsillectomy for frequent sore throats. Following this operation she was treated at another hospital for thyroid toxicosis. In 1920, on account of severe dysmenorrhea, she went to still another hospital where a ventral fixation operation was done. During the year previous to present admittance, 1926, she had fits, biting her tongue, frothing at the mouth, and fainting spells. She was always constipated. The patient had been in Bellevue Hospital previously for treatment of epileptic fits and heart trouble.

The physical examination revealed no striking abnormalities. The patient was slightly nervous and there was appreciable bleeding from the uterus. The Wassermann was negative. High voltage x-rays to the pelvis was advised and during

the course of the treatment from May 27 to June 17, 1927, bleeding increased at first but later stopped entirely. The patient was very nervous and on June 8 had an epileptic fit while asleep. On July 8 she had another epileptic fit but no bleeding. August 29 she had a slight fit. On Oct. 3, 1927, she reported to the clinic in excellent health, had had no bleeding since June, 1927, and no "fits" since Aug. 29, 1927, had gained several pounds in weight, weighing then 108 pounds. She complained of occasional flushes and night sweats.

The patient was seen again in April, 1928, in excellent condition, had had two slight fits, Nov. 6, and 22, 1927.

In January, 1929, the patient was seen again and was in excellent condition, had had no menstruation since April, 1927, and no bleeding since June, 1927, however, had a slight epileptic attack in June, 1928. In January, 1929, she felt fine, weighed 125 pounds, had only occasional flushes.

On Sept. 4, 1929, patient was married and had a nose bleed the day following, probably a vicarious menstruation. However, because the menopausal symptoms persisted x-ray therapy to the pituitary was given in January and June, 1930, with some relief.

At present, July, 1932, the patient feels fine, has had no epileptic fits since June, 1928, no uterine bleeding since June, 1927, but complains of occasional flushes. Her present weight is 136 pounds and her general condition is excellent and she wishes at the present time to become pregnant.

I believe that epilepsy associated with metrorrhagia and dysmenorrhea and with some thyroid toxicosis may be controlled by the x-ray suppression of the menses.

55 EAST 86TH STREET.

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## OMPHALITIS OF THE NEWBORN\*

C. C. WEITZMAN, M.D., BROOKLYN, N. Y.

MRS. R. A., admitted to Williamsburgh Maternity Hospital on the evening of April 2, 1931, gave birth on the following morning to a female infant, weighing 11 pounds 8 ounces. The delivery was normal and spontaneous, and the baby at birth was a perfectly normal child. She was sent to the nursery in perfect condition, after the usual routine treatment. The eyes had been treated with a 1 per cent solution of silver nitrate, and the cord, which had been tied about  $\frac{1}{2}$  inch from the umbilicus, was dressed with a dry sterile dressing.

For the first three days the baby was normal in every respect, including respiration and temperature. Its weight remained stationary during this period.

On the fourth day the infant developed a temperature of 101° F. and exhibited marked jaundice. At the same time her respiration rose to 32 per minute. She was given a teaspoonful of castor oil and a colonic irrigation, and was taken off the breast and put on a formula.

On the fifth day the jaundice increased in severity, while the temperature went down to 100°. Colonic irrigations were given twice a day. Respiration and jaundice increased, however, although the stools continued to be of the normal yellow color.

On the following day the temperature was 102°; respiration had become 56 per minute, and the jaundice still more severe. A clysis of 40 c.c. saline solution

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\*Read before Beth Moses Hospital Clinical Society, April 21, 1932.



was accordingly given. The lungs were found negative. The increased respirations and the intense jaundice could not be accounted for. The stools continued to be yellow, and were never of the clay color characteristic of obstructive jaundice.

On the seventh day the temperature reached 104°; respiration was 60 per minute, and jaundice had increased still further. Another clysis of saline solution was given, and also a colonic irrigation.

On the eighth day the temperature was still 104°; the intense jaundice and rapid respiration showed no abatement but, on the contrary, exhibited a still further exacerbation, and the infant died on this day.

At autopsy a dense infiltration of polynuclears and mononuclears was observed about the umbilical vein, extending its entire length. The liver was increased to about three times its normal size, and was of soft consistency. All the organs of the body were in a condition of marked jaundice, the presence of bile being observed everywhere.

Microscopic examination of the liver revealed the presence of an infectious hepatitis throughout. Death was due to infection from the umbilicus, notwithstanding the perfectly normal appearance of the navel to the naked eye.

During the entire eight days of this infant's life, there had been no sign of abnormality in the lungs nor any indication of infection around the umbilicus. The only irregular signs were the marked jaundice, the increased respiration and the toxemia.

847 EASTERN PARKWAY.

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## A DEVICE FOR THE CORRECTION OF POSTPARTUM UTERINE ATONY

EMERSON L. STONE, M.D., NEW HAVEN, CONN.

**M**ASSAGE or manual compression of the freshly delivered uterus for the control of atony and bleeding is not always easy or effective. Excessive thickness of the abdominal wall or spasm of the muscles often renders the fundus uteri inaccessible. The attending physician is often preoccupied with the resuscitation of the infant, examination of the birth canal, or with surgical work on the perineum, while the necessity for massaging the uterus may interrupt prematurely his aseptic routine. The commonest causes of failure in the hands of nursing assistants include (1) faulty instruction in the technic of the maneuver and inadequate realization of its significance, (2) insufficient strength to maintain the necessary degree and duration of pressure, (3) a tendency to relax the effort out of sympathy with the patient's objections, and (4) inability to evaluate properly the abdominal and vaginal signs which determine the success of the treatment.

Artificial devices for the maintenance of pressure often fall short of maximum efficiency. Ordinary abdominal binders neither exert any effective force upon the freshly delivered uterus, nor can they be securely maintained in place.

In order to achieve consistent and dependable uterine stimulation, a girdle has been devised consisting of two plates of light canvas joined on each side by four parallel straps with adjusting buckles. After delivery of the placenta, the plates are adjusted to the abdomen and back. A pile of folded towels is placed beneath the upper plate just above the contracted uterus, and the girdle is snugly tightened, forcing the barrier of towels down behind the uterus, not over it. The abdomen is so compressed in its upper half or two-thirds that it is impossible for the uterus to rise up and bleed. Compression of the aorta may be a contributing factor but is probably of less importance.

The immediate benefits of the procedure are (1) the uterus is made firm, uniformly, promptly, and continuously, (2) it is comfortable to the patient since the pressure is distributed over a broad area, (3) it makes massage unnecessary and permits the attendants to perform other essential duties, (4) if inspection of the cervix is necessary, it is already rendered accessible without extra pressure or traction, and (5) if tamponade is required, the packing is accomplished more easily and with less material, against the firm resistance of the secured uterus. By means of a T-binder attached to the abdominal girdle, the pressure of the vaginal tampon can be maintained snugly. The girdle is generally removed in four to eight hours, preferably by a graduated release of pressure.

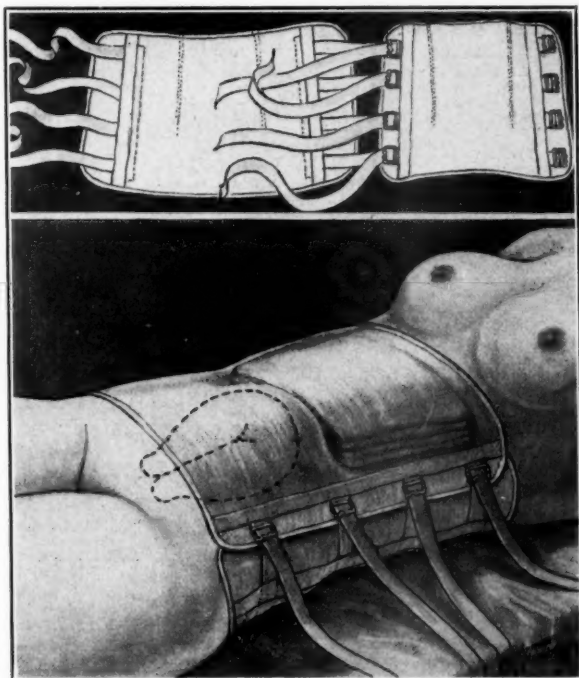


Fig. 1.

The garment is particularly designed for those patients who bleed too freely from atony, or those in which the uterus tends to relax abnormally regardless of the degree of hemorrhage. In its use over an extended period, there has been a uniformly prompt and persistent contraction; no serious hemorrhage has occurred, early or late; and no direct or indirect evidence of trauma or other complication has arisen. The device is light but strong and durable. It is adaptable with equal effect to patients of differing size and contour. It is washable, portable, and hence adapted to both hospital and outside practice.

The Spencer Corset Company of New Haven has kindly made up the garments according to specifications and has rendered every courtesy in helping to evolve this adjunct to our therapeutic equipment.

129 WHITNEY AVENUE.

## A CASE OF ACUTE FIBROID DEGENERATION WITH COMPLETE TORSION OF THE UTERUS

ABRAHAM J. FLEISCHER, M.D., AND J. IRVING KUSHNER, M.D.,  
NEW YORK, N. Y.

*(From the Department of Obstetrics, The Bronx Hospital)*

MRS. I. B., aged forty-five, admitted to The Bronx Hospital because of vaginal bleeding, lower abdominal pain, nausea, and temperature of 101°. Family history irrelevant. Past history revealed a similar attack four years ago diagnosed as appendicitis and treated conservatively. Menstrual periods began at the age of eleven, of the twenty-eight day type with six day flow. No pain. No leucorrhea. Always regular. Para i, gravida i. For the past year periods have increased in length and have been associated with the frequent passage of clots. Present illness began two days before admission in an intermenstrual period, with nausea, abdominal pain and bleeding. Temperature continued to rise, medication gave no relief.

Examination showed an obese, middle-aged female, acutely ill. No jaundice or cyanosis. No dyspnea. Temperature 102.5°, pulse 112, regular and of good quality. Respirations 26. Heart and lungs were negative. Blood pressure 140/90. The lower abdomen was filled with a firm, irregular, nodular mass slightly tender. On vaginal examination this mass was felt as distinct from the uterus. A diagnosis of twisted ovarian cyst or twisted fibroid was made and she was removed to the hospital for operation.

Under spinal anesthesia, a mid-line incision was made below the umbilicus, revealing a large fibroid which together with the uterus filled the true pelvis and extended to the right lower quadrant of the abdomen. The uterus was twisted upon its long axis so that the right tube and ovary lay posteriorly and to the left. The left ovary contained a simple parovarian cyst, and was situated anterior and to the right. A supravaginal hysterectomy, bilateral salpingo-oophorectomy and appendectomy were done. The postoperative diagnosis was degenerating fibroid of the uterus producing torsion and a simple parovarian cyst. The uterus was approximately 16 by 15 cm. The left ovary was atrophic and the seat of a parovarian cyst 4 by 5 cm. and containing a clear serous fluid. The entire posterior and right lateral walls of the uterus were occupied by a firm fleshy mass showing here and there areas of hemorrhagic softening and cystic degenerations. The entire uterine cavity was reduced to a small slit-like opening which was pushed to the left and upwards, and ran in a spiral direction. The right ovary contained one large lutein cyst. The tubes appeared to be normal. Sections showed a leiomyofibroma with areas of anemic autoinfarction and hyalinization.

Patient made a fair recovery, the postoperative course being complicated by a right upper bronchopneumonia. She was discharged, well, on the nineteenth postoperative day.

This history demonstrates that extreme torsions of the uterus must be considered in the diagnosis of pelvic disease, particularly when fibroid degeneration has taken place, presenting similar findings on bimanual examination to that of a twisted ovarian cyst.

1882 GRAND CONCOURSE.  
215 EAST GUNHILL ROAD.

## Society Transactions

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### NEW YORK OBSTETRICAL SOCIETY

MEETING OF FEBRUARY 14, 1933

DR. EDW. L. KEYES read, by invitation, a communication entitled **The Importance of Establishing a Conditional Reflex "Pregnancy—Syphilis" in the Minds of the Medical Profession.** (See page 71.)

DR. ARTHUR STEIN read, by invitation, a paper on **The Relationship Between Gynecology and Orthopedics.** (See page 64.)

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### CHICAGO GYNECOLOGICAL SOCIETY

MEETING OF FEBRUARY 17, 1933

DR. SOL. LITT read a paper on **Autotransplantation of Placenta to the Anterior Chamber of the Eye and Its Effect on Lactation.** (See page 37.)

DR. R. A. LIFVENDAHL read a paper entitled **Hematometra Cervicalis with Special Reference to Pelvic Endometriosis.** (Will be published in August issue.)

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**Pastiels: Severe Eclampsia Treated by Supra-pubic Cesarean Section After Failure of Delmas' Method, Bruxelles-med. 10: 493, 1930.**

Pastiels feels that where medical treatment of eclampsia has failed to check the progress of the disease, evacuation of the uterus is indicated. The two procedures of choice are (1) Manual dilatation of the cervix under spinal anesthesia according to the technic of Delmas or (2) supra-pubic cesarean section.

He reports in detail a case where failing manual dilatation of the cervix a low cesarean section was done with excellent results. He points out that one reason for failure of the first method was muscular constriction of the internal os due possibly to an isolated muscular irritation by the toxins of the eclamptic state, and cites a somewhat similar case reported by Coll de Carrera and Bremond in which spinal anesthesia failed to obtain a paralyzing effect on the cervical musculature. This latter author further feels that in eclamptic states it is always more difficult to obtain cervical dilatation under spinal anesthesia.

THEO. W. ADAMS.

## Special Article

### THE DEVELOPMENT OF MARRIAGE CONSULTATION CENTERS AS A NEW FIELD OF SOCIAL MEDICINE

MARIE E. KOPP, PH.D., NEW YORK, N. Y.

#### THE ORIGIN AND HISTORY OF THE MOVEMENT

MARRIAGE consultation centers in Germany and Austria, more than one thousand in number, are chiefly a postwar development. Although operating under a variety of names,\* they have the common purpose of directing public opinion toward the betterment of national health in relation to the family.

The groundwork for the growth of these centers can be discerned in the activities of certain lay groups. The Society for the Protection of Motherhood and Sex Reform started its work as early as 1905, under the able leadership of Helene Stöcker. In 1908, a group in Dresden interested in race improvement and race hygiene recommended the compulsory exchange of health certificates before issuance of the marriage license.

Certain conditions which resulted from the war, or became manifest after it, precipitated the development of consultation centers in Germany and Austria.

1. The loss of men in the age groups of twenty to fifty during the world war left a considerable number of women without an opportunity to found a family.

2. The economic situation and shortage of dwellings emphasized still other factors.

3. The increase in divorces from 14.1 for 100,000 inhabitants in 1900, to 56.8 in 1925, that is, equal to four times the ratio of 1900.<sup>1</sup>

4. An increased distribution of a large amount of literature on sex questions is still another factor.

Side by side with these loosely related social problems was the desire of the state to rebuild the nation's health.

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*Editor's Note.*—The article by Miss Kopp may seem foreign to the scope of this Journal. However, the medical profession has been made to realize, perhaps too slowly, that there are allied fields with which its contacts have not always been sufficiently close. The study of marriage justly may be regarded as one in which the doctor assumes a responsibility and should manifest an interest equal to that of the sociologist, the psychologist, the lawyer, and the clergyman. Europe has already acknowledged the value and desirability of establishing consultation centers and Miss Kopp has recently completed a personal survey of the clinics in German speaking countries and organizations with the cooperation and support of the Oberlander Foundation. We take pleasure in presenting this report to the readers of the Journal and believe it will be of interest and value to those who have possibly considered the desirability of developing such activities in this country. A similar survey of the American situation will probably be undertaken in the future by the same author.

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\*The names Marital Consultation Centers, (Eheberatungsstellen), Consultation Bureau on Sex Hygiene (Sexualberatungsstellen), Prenatal and Postnatal Clinics (Schwangerschaftsberatungsstellen), and Birth Control Clinics (Beratungsstellen für Geburtenregelung) cover a variety of services pertaining to motherhood.



The Berlin Race Hygiene Society, now the Eugenics Association, and some medical groups, renewed in 1916, and 1917, earlier discussions concerning the advisability of compulsory medical examinations as a basis for an exchange of marriage health certificates before the issuance of a license. It was felt, however, that education on the responsibility of each human being to pass on a healthy mind and body must precede legislative measures.

At their instigation, the National Government decreed that a circular be handed to all applicants for marriage licenses, calling attention to the importance of physical and mental health to a happy marriage and healthy offspring. Valuable as this procedure might have proved it scarcely could be made effective at so inopportune a time as two weeks prior to marriage, but it served a useful purpose in centering public attention on the fact that only the healthy should propagate.

With the extension of the impersonal sickness insurance in Germany and Austria people found it more difficult to discuss their personal problems than had been possible when a family physician was available, yet many individuals who received medical care through sickness insurance, or specialist's services, aroused by the publicity given the idea of compulsory exchange of health certificates, were eager for information and guidance respecting their own chances for healthy offspring. Hence the need for some new form of service among people, who are without a family physician, proved to be another important element contributing to the establishment of consultation bureaus in various parts of the country.

The chief driving power back of all these efforts were the scientists at the various universities, who had been quietly active in the classroom, through their writings and on the public platform. Each in his own special field made it known that race hygiene and race betterment are the natural concern of everyone. This educational leadership emanated from such men in biology and genetics as: Eugene Fischer, Muckermann, von Verschuer, Lenz and others; from such men in psychiatry as Rüddin, Hübner, Lange, Gerlach and Häberlin, from gynecologists such as Sellheim, Paul Strassmann, Max Hirsch, Flaskamp and Niedermeyer, and in the field of public health, such men as Grotjahn, Tandler, Thiele, Poll, Ostermann, von Drigalski, Fetscher and Iapha. Rüddin, Hübner, Gerlach, Häberlin, Muckermann and Lenz, have been actively engaged for years in advising students and other applicants on eugenic problems. The education of public opinion by leading university men, has been a sustained effort for the last thirty years.

#### ESTABLISHMENT OF CONSULTATION CENTERS UNDER MUNICIPAL AND PRIVATE AUSPICES

In 1919, the Berlin Institute for the Study of Sex? (Institut für Sexualwissenschaften), a privately supported organization at first, but now a Government institution, interested in the study of sex, opened a consultation center for advice and guidance on sex problems. In 1923, a marriage consultation center was opened in Dortmund as a privately supported enterprise, and Dresden followed suit in 1923. The Society for the Protection of Motherhood opened a number of centers in 1924, in Frankfurt-am-Main, Mannheim, Breslau, Berlin.

The first matrimonial health consultation center for marriage candidates was opened in Vienna in 1922, under public control. This experiment was part of the social medical welfare work of the Municipal Board of Health. Its main objective was the ultimate improvement of national health.

In 1926, the Prussian Social Welfare Ministry recommended the establishment of municipal centers for giving premarital advice. The chief aim was the furtherance of race hygiene and race improvement, understood mainly to be an educational measure to enlighten voluntary applicants regarding heredity and eugenics, and to awaken them to their responsibilities to the next generation.

As a result, the first official advice bureau was opened that year. This bureau, located in the thickly populated district of Prenzlauerberg-Berlin<sup>3</sup> was organized as a consultation center on all problems relating to the health and social welfare of the family. By Jan. 1, 1931, some 200 centers had been established in Prussia.<sup>4</sup>

In 1927, the Saxon-Thüringen Ministry of Labor and Social Welfare<sup>5</sup> recommended the establishment of marriage advice centers as part of the social welfare work of the State. This was an official recognition of the work of the advice bureau, conducted in Dresden under private auspices since 1923. In 1928, the Ministry of the Interior of the Free State of Braunschweig also took official action and recommended the establishment of marriage advice centers with functions and scope similar to the Prussian pattern. At this point, an added impetus was given to the development of marriage advice stations by a newly enacted law on the treatment and handling of venereal diseases. This law of 1928 provided that all persons suffering from syphilis, gonorrhea, and chancre must undergo treatment by a licensed physician, and that disobedience and negligence in following instructions is punishable under the law.

In Switzerland, Zürich established an official marriage consultation center in 1929, dividing the work into advice on problems arising before marriage, during marriage, or, in relation to child guidance and education. Basle opened an official advice bureau in January, 1933, as part of the City's Welfare and Public Health Work.

Departments of Health of many smaller cities cooperate with the local insurance organizations in marriage advice centers, as in Dresden, Lübeck, Hamburg, Linz, and other cities. The Union of the Sickness Insurance Organizations of Berlin (Verband der Berlin Ortskrankenkassen), for example, has organized seven centers, which are distributed throughout the city. The National Association of the "Krankenkassen" established the services upon amendment of by-laws in 1927, permitting the dispensation of contraceptive articles to policy holders. This measure was taken to reduce the heavy expense incurred by insurance organizations through a large number of sick leaves resulting from the spread in the practice of abortion. An abortion cost the Berlin Sickness Insurance Organization (Ortskrankenkassen von Berlin) from 50 to 70 Reichsmarks<sup>6</sup> without taking into account cost for treatment for pelvic disorders resulting from abortifacient practices. Sickness insurance is obligatory in Germany, Austria, and Switzerland for workers in industries and trades paying wages below a certain income level.

In addition to the municipal marriage consultation centers, and the centers maintained by the sickness insurance organizations, there are about one thousand marriage consultation centers, privately supported through membership. Some of these organizations have traveling outfits (Fliegende Beratungstellen) which move from place to place at regular intervals. These are manned by a physician and an employee, called a "Funktionär," an individual without social or scientific training. They extend the services of the organization to members residing in outlying districts. The best known of these organizations is the Society for the Protection of Motherhood and Sex Reform (Bund für Mutterschutz und Sexualreform). Since its inception in 1905, the organization has gradually expanded its work by establishing consultation centers in most of the larger cities. It has over 100 such affiliated centers today. Physicians are in charge in the larger cities, as in Berlin,<sup>7</sup> Frankfurt-am-Main, Hamburg, while in all other centers social workers are advising and redirecting applicants to the various services for treatment. Two of the Berlin centers, and the Frankfurt center, are a joint venture of the official consultation center. The League for the Protection of Motherhood and Family Social Hygiene (Liga für Mutterschutz und Soziale Familienhygiene) with a membership of about 27,000 has over 500 birth control centers. Only three are under the direction of a physician. Some of these places have worked out arrangements with some

local physician, who agrees to give consultation and advice on personal problems and sex hygiene, but the majority of stations are advice centers, where laymen are advising on birth control measures, furnishing certain articles direct, or, where the method requires prescription and instruction, referring the applicant to a physician. The National Organization for Birth Control and Sex Hygiene (Reichsverband für Geburtenregelung und Sexualhygiene) with a membership of 20,000 is the largest organization of its kind. It has over 230 affiliated local groups, each with a consultation center. Chief emphasis is put on birth control advice, as implied by the name of the organization. Physicians are in charge of the centers of Berlin, Hamburg, and Nürnberg. The Association for Limiting the Size of the Family (Verband für die Kleinhaltung der Familie), with some 12,000 members is also chiefly interested in birth control advice and sex hygiene. Aside from these larger organizations mentioned are a number of smaller groups with similar aims. The total membership of these lay groups was said to be 113,000 at the end of 1931, and it is to a large extent recruited from among the working classes. The organizations are based on a cooperative plan, supported by yearly membership dues ranging from three to eight Reichsmarks (equal to 75 cents to \$2.00) which provides for free treatment, that is, prescription of method, and distribution of materials at wholesale price, and a monthly magazine on Social Hygiene and Sex Education. The advice centers of the Bund für Mutterschutz, however, receive regular subsidies from the various city governments in recognition of the work done in the community.

There are no restrictive laws in Germany, Switzerland, and Austria, prohibiting the manufacture, transportation and distribution of contraceptive articles, but regulations governing the sale of articles recognized by the medical profession to be injurious are strictly enforced. These lay groups were organized for the protection of the public from commercial exploitation by manufacturers. They were instrumental in enlisting the cooperation of physicians in the campaign to protect women from using harmful methods, and education in sex hygiene.

A large number of marriage advice centers are run under the auspices of national, or local women's organizations, that is, by some political groups, but the majority are run as part of the social work of various church groups. The advice bureaus conducted under these auspices emphasize the philosophic, ethical, and religious adjustment to the marriage union, the legal protection of the wife and children, and the practical angles of housekeeping and budgeting. Recognizing that the lack of care of children and of the home, is the cause of a great deal of domestic maladjustment, they are inducing the women to take courses in cooking, sewing, mending, nursing so as to remove causes of friction. This method of solving matrimonial difficulties is particularly well organized in the Roman Catholic centers.

Most of these centers were established in 1931 and 1932. They were not intended to duplicate the work of the municipal marriage advice centers, but rather to supplement such work with the spiritual and educational advice. There is close cooperation among the women's organizations affiliated with the social work of the church groups.

In Freiburg im Breisgau, for instance, where the medical marriage advice bureau is located, in the Women's Hospital, part of the University, advice to both Roman Catholic and Protestant patients is given by the same physician, but at different sessions, so as to afford the spiritual advisers the opportunity to carry out their part of the mission.

The women's organizations under the auspices of the Roman Catholic Church have 50 centers distributed all over Germany; those under the auspices of the Protestant churches 13, and the Jewish Women's organizations have only two centers, one in Berlin, and one in Frankfurt-am-Main.

Applicants to almost all of these religious centers are redirected for professional service to physicians, lawyers, or other social welfare centers.

The advice bureaus, which deal with legal questions relating to the marriage union, are primarily sponsored by the national or local women's organizations, or legal aid societies. The scope of these bureaus also covers two periods when legal advice is desirable, or needed. First, premarital advice, which covers all legal steps needed to protect the woman's rights of property, and possibly the drawing up of a marriage contract. Second, advice to the married applicants, which naturally refers mostly to economic difficulties and divorce, and the possible, or probable court decision in each case in regard to grounds of complaint, custody of issue, and support of dependents.

In 1926, a group of people interested in the spread of information on legal questions and laws regarding real and personal property (the Verein der Freunde des Rechtsauskunft und Güteswesen), in Hamburg, opened an advice center for the engaged and married couples. Berlin, Dresden, Heidelberg, Breslau, Bochum, Munich, and Hanover, have well-established legal marriage advice centers, and in addition to these are a number of centers sponsored by religious groups, consultation sessions as a rule, run simultaneously with the medical consultation. Legal advice on marriage questions is also given at the official legal aid center of each community.

#### ADMINISTRATION, FUNCTION, AND GROWTH OF THE CENTERS

In the experiences of the official marriage advice bureaus in Vienna, Dresden, and Berlin, however, it was readily demonstrated from the very start by the problems for which the applicants sought advice, that premarital advice in the spirit of the Governmental decrees was too limited in scope to meet the need in the community. Husbands and wives, who had encountered difficulties in family adjustment were the most frequent visitors, which brought about a definite shift in the purpose for which the centers were established. Applicants fell into three main categories:

1. Candidates for premarital advice.
2. Men and women seeking advice on problems in the existing marriage.
3. Men and women in and out of wedlock, who want guidance and advice on sex and other personal problems.

The German idea of medical premarital advice is based primarily on the idea of mental and physical fitness of the candidates for marriage, and of their fitness to pass on a healthy mind and body to their children. One important part of the function of the advice centers is the medical certification on the fitness for marriage of minors. In some sections of Germany and Austria, the procedure is compulsory, and in many it is a customary function of the guardianship of minors to secure a medical certification before issuing a marriage permit. Such advice would be based on medical examination on the case history of the candidate, and on the case histories of the direct and collateral lines of their blood kin so far as it was possible to get information. This is in marked contrast to the American concept of marriage advice, which as a development of preventive medicine, focuses its attention on the more immediate need of the couple, that is, advice in, and guidance on, problems of conjugal adjustment.

Advice services provide at present consultations in all domains of medicine, social hygiene, psychology, biology, heredity, eugenics, and child guidance. Leaders in marriage advice work are agreed that these centers should be for consultation, not treatment. Accordingly an important feature of their work is the referring of applicants elsewhere for whatever special service may be needed to remedy psychic

or somatic ills. Social welfare agencies of the municipality and the Ortskrankenkassen are the main treatment centers. Similarly many centers, which do not give contraceptive instruction, refer applicants in need of such service. This practice is followed by the marriage consultation centers of Vienna, Dresden, Frankfurt-am-Main, Berlin-Prenzlauerberg, and elsewhere. On the other hand, a very large proportion of marriage advice bureaus do give contraceptive instruction to their clients. In still others, notably in some municipal centers, the direct giving of such instruction has been left by the Government entirely to the discretion of the counselors in charge of each center. All consultation centers, which are conducted under the auspices of national or local women's organizations limit their functions to consultation and advice, and possibly relief measures.

In some centers the scope is extended to include legal and economic problems, as well as questions relating to child health and adult and child education. Thus it is evident that the term marital advice has widely varying connotations.

The consultation service in Germany, Austria, and Switzerland, is designed to help the class of people with small incomes, who cannot afford physicians' and lawyers' fees, to discuss personal and family problems. Naturally, the more intelligent of the underprivileged are the ones who voluntarily make use of such service. In Vienna and Dresden, the domestic relations and children's courts often direct their clients to make use of the service. In Lübeck the municipal welfare exchange automatically refers its charges to the consultation center.

Recommendation from person to person represents the main source of applicants. In addition these advice centers are brought to the public notice through a variety of channels. Most of the official stations display posters in hospitals, at the marriage license offices, at Ortskrankenkassen, in the Government welfare stations, churches, railway stations, and other public places describing the consultation centers and their functions. Posters are conspicuously placed all over Berlin and in other cities.

The German Ministry of Health's circular on social hygiene and race improvement is distributed in all marriage license offices. Particularly successful educational work on all marriage questions is carried forward under the auspices of a large variety of medical or legal educational groups. Talks over the radio and press publicity keep the activities before the public. The cooperative organizations on birth control, education and enlightenment on sex matters have well organized publicity channels by means of monthly evening lectures on hygiene and related subjects (ordinarily given by a physician) and a magazine supplying reading matter and plenty of advertising. The circulation of some of these magazines is very considerable, and in some cases far exceeds the membership list. The *Liebe und Leben* has a circulation of 60,000, the *Wackruf* 30,000, and the *Sexual-hygiene* 21,000 copies. Members of the political and religious groups are reached by means of pamphlets, circulars and posters at meeting places. The various churches use pulpit, press and platform as a means of attracting applicants to the marriage advice centers.

The centers are usually located in the densely populated sections of the cities accessible to the various transit lines. They are usually housed in the offices of the Public School physician, municipal buildings, or in Ortskrankenkassen. In all cases, offices are located in a secluded section of the building, where privacy is ensured, and the applicant protected from the curiosity of outsiders.

The staff consists of a consulting physician, a medical social worker, and sometimes in addition, a volunteer medical social worker to follow up cases. Most of the centers hold two or three weekly sessions; one in the early afternoon, in order to give the housewife a chance to come at a time when she can best leave home



unobserved. The average number of visitors at a single session is six in the large consultation centers. Consultation, however, often takes place by appointment outside of the regular office hours to suit the applicant's time and need.

The reception of applicants differs from place to place. In most of the municipal advice centers, the applicant is first interviewed by the medical social worker, who takes down the social history and makes a social investigation.

To facilitate the interchange of information, the applicant is asked to sign a statement releasing the physicians, or hospitals, or lawyers, from obligation of professional secrecy in regard to information on previous treatments. Such information, however, may be used only by the staff members of the center consulted. It is customary as it would be in private practice, or in social welfare work, for the marriage counselor to confer with the person in charge of the service to which the patient has been redirected. This person in turn sends a written report to the advice center on the type of treatment given. These reports, which are filed at the marriage consultation center, constitute an automatic check on whether the applicant actually sought the treatment recommended. Practically all the centers report that instructions frequently are not followed. Serious as this situation is recognized to be, leaders in the marriage consultation movement realize that pioneer work such as this must in its experimental phase develop its technic slowly. It is not altogether surprising, therefore, to learn that applicants who fail to follow the advice given, receive merely a polite note reminding them that the suggested procedure is for his, or his family's own good.

A problem of outstanding importance in the development of marriage advice service is the finding of counselors who have the requisite qualifications for the task. In this field particularly the personality and the human qualities receive foremost consideration for the task. Sympathy, insight and tact are regarded as a *sine qua non*. Next in importance obviously, are technical and professional training coupled with experience. Candidates for the marital advice centers, which operate under Government auspices, and in this instance the Krankenkassen would be included under that designation, must be licensed physicians and with university training in economics and sociology, who have been engaged for a few years at least in private practice, and who have had at least academic knowledge of public health, maternal health, endocrinology, psychology, psychotherapy, child guidance, and eugenics. They must be familiar also with the policies employed for promoting personal hygiene in the interests of the health of the nation. As stated elsewhere, the privately supported advice centers frequently are not called upon to give other than contraceptive advice. In the majority of cases this is accomplished by referring the applicants to some physician in the community. As a rule only in the larger cities is the center under the direction of a physician. In the vast majority of smaller centers a trained social worker is in charge.

The counselors for the most part are men and women in age groups between thirty and forty-five. The general feeling is that those above or below these limits are undesirable, because of little experience on the one hand, or of being out of touch with new ideas on the other hand. While most of the counselors in Germany and Austria are married, that feature is not especially stressed. Neither is happiness or unhappiness in marriage a determining factor in the selection of counselors. An exception in the general attitude is that of the church groups, where the work consists largely of redirecting applicants. In the Catholic centers it is felt that a married woman, not necessarily a physician, who has shown her community that she is able to handle her family life successfully, is well adapted to the services required. In Protestant centers such services are rendered frequently by wives or widows of the clergy.

One other factor widely discussed by those interested in the development of marriage advice work is the desirability of choosing as counselors physicians interested in public health and general medicine, rather than specialists in any particular domain of medicine. It is held that certain specialists should not be considered as counselors, not only because of the danger of overemphasis of the particular specialty, but for a variety of other reasons. The urologist is not regarded as a happy choice, because of the fear of so many people that they might be suspected by others of having venereal disease. The choice of a gynecologist or obstetrician is not viewed with favor because the centers wish to limit their service to consultation and advice, a task considered more difficult in these specialties where the patients recognizing the close relationship between the technic of examination and treatment expect to receive treatment also. An added objection arises because the nature of the specialty naturally leads to an expectation that birth control instruction may be readily obtained. Hence the broader purpose of giving marital advice on any problem may, it is feared, narrow to the giving of contraceptive advice only. Still other considerations render the psychiatrist or tuberculosis specialist a less desirable choice. Some authorities have called attention to the danger not only of letting hereditary factors overrule human considerations, but of inducing a hypochondriacal condition by overemphasis of the individual's potentialities for hereditary taints.

In most centers, a medical social worker assists the counselors in the reception of applicants, and in effecting the necessary contacts with the community's social and medical agencies. Her schooling consists of specialized training in one of the various fields of social welfare work, that is, graduate in either nursing, teaching, kindergarten, or domestic science. To this specialized training must be added two years in a school of social service, where she is instructed in the academic and practical side of social welfare work. In addition to the regular staff, the services of volunteers are employed in making contacts and for special follow up.

The cost of maintaining consultation centers in Germany and Austria is defrayed from various sources: taxation, subsidies, insurance, membership dues, church and party funds. No fee is charged in any of the centers. In the municipal centers, supplies sometimes are furnished free of charge. The cooperative centers furnish birth control supplies at cost. As mentioned elsewhere, the Krankenkassen since 1927 have permitted the dispensation of contraceptive articles to policy holders.

The municipal centers are supported from public funds. Centers at the Krankenkassen derive their support from insurance funds maintained jointly by employer, worker, and the national and state governments. The private cooperative centers are supported from yearly membership fees. One of these, the Bund für Mutterschutz, receives regular subsidies from the municipalities. In some cities this organization supplements the work carried on by the municipality by furnishing supplies or special services. Churches and political welfare groups defray the cost of their centers from organization funds.

The chief items of expenditures are salaries, rent, equipment, and in some cases supplies. In the cooperative, religious and political centers, the medical and legal counselors volunteer their services. These centers and the Krankenkassen provide their own quarters. In the centers maintained by the municipality, the rent for office quarters does not involve extra expense as the centers generally use the public health examination places in schoolhouses or municipal buildings. In many instances the offices of the Krankenkassen are put at the disposal of the city for marriage advice centers. The only expenses therefore incurred by the community are the items for printing and sundries.

Charges for service to applicants, who are able to pay, are being discussed as a measure to raise funds for the financing of special research, but so far no action has been taken in any one of the centers. The desirability of such studies is evident, for until the results of efforts along these lines have been analyzed we are without proper means of evaluating them.

The community usefulness and need of the marriage consultation centers are best demonstrated by the number of applications for service in some of the larger centers. The Vienna centers established in 1922, have an average yearly intake of somewhat less than 500 cases<sup>8</sup> and an equal number of revisits of former applicants.<sup>8</sup> The Dresden center<sup>9</sup> established in 1926, as a cooperative enterprise between the Ortskrankenkassen and the State show a steady increase of new cases from 111 in the first year to 1285 in 1932, plus revisits, which are not numerically recorded by this center. The Berlin-Prenzlauerberg<sup>10</sup> averages about 300 new cases, the revisits amounting to about 150 yearly. In Hamburg<sup>11</sup> the municipal marriage advice center (Vertrauensstelle für Verlobte und Eheleute) registered yearly about 250 applicants since its opening in 1926, and it averages somewhat less than 400 revisits per year.

The seven centers of the Berlin Ortskrankenkassen<sup>12</sup> took care of 2455 new cases in 1928, the year of opening the marriage advice center, and listed 3576 revisits. For the year of 1931,<sup>13</sup> 5630 cases were advised and the revisits of former applicants amounted to 14,548 consultations. Naturally a considerable number of applicants, who consulted the municipal centers are registered with the Ortskrankenkassen for treatment. The marriage advice center of Frankfurt-am-Main,<sup>14</sup> a joint venture of municipality and the Bund für Mutterschutz advised 7665 cases since 1925. Centers like Lübeck<sup>15</sup> Mannheim, Chemnitz, Breslau have registered about 150 cases per year and are now up to approximately 200 and some over. Unfortunately, the number of cases in the various centers of the Bund für Mutterschutz<sup>16</sup> are not tabulated, as yet, but the Berlin centers would indicate a caseload of about 300 a year, for the larger cities. Birth control advice is given in these centers, which partly explains the large caseload. The municipal marriage consultation<sup>17</sup> center of Berlin-Reinickendorf in 1929, had 280 applicants in its first year under new management. In 1930, there were 221 new applicants and 712 revisits. In 1931, there were 181 new cases and 580 revisits, and for 1932, new applicants amounted to 148, and there were 372 revisits.

The foregoing figures are quoted not so much to demonstrate the growth of the center, but more to show the actual demand of service given in the center. Women far outnumber the men in most of the centers; the opposite is found only in the age group of the younger applicants. In the centers under the auspices of the Roman Catholic Welfare groups, it is said that there are more men than women; no corroborating data have yet been published. Single and married men and women are treated on an equal basis in regard to the type of advice needed.

Reports on the analysis of the intake in the various marriage consultation centers give a fair picture of the type of applications. Because we do not know their numerical strength, the proportion of cases, however, is misleading owing to the fact that the total number of applicants is not recorded.

Premarital advice was sought in 1927, 1928, in some of the large centers by the following proportion of the applicants of the center:<sup>18</sup> Berlin-Prenzlauerberg 66 per cent, Dresden 45 per cent, Berlin-Neukölln 35 per cent, Mannheim 19 per cent, Berlin-Reinickendorf 16 per cent, Kiel 11 per cent, Berlin Friedrichshain 11 per cent, and Chemnitz 4.5 per cent.

Marriage consultation, meaning in this relation control of conception, certification for therapeutic abortion, sterilization and problems of sterility and all other prob-

lems of conjugal adjustment. The largest centers show that marriage advice in the above mentioned categories was sought in 1928, in Berlin-Kreuzberg by 86 per cent, the Ortskrankenkassen Berlin by 72 per cent, in Lübeck by 64 per cent, and in Berlin-Friedrichshain by 61 per cent and in Kiel by 57 per cent, while Berlin-Prenzlauerberg had only 51 per cent. Contraceptive advice represents the major part of the work in the center under the auspices of the Bund für Mutterschutz, and of course, in the centers of the lay organizations for birth control and sex advice. Contraceptive advice was sought in the seven centers of the Ortskrankenkassen in Berlin in 80 per cent of the cases for the year of 1928, and in 76 per cent for the year of 1931. In Frankfurt-am-Main, a joint venture of municipality and the Bund für Mutterschutz it was 80 per cent for the year of 1930<sup>19</sup> and in Hamburg the Bund für Mutterschutz also reports birth control advice in 80 per cent of its cases. In Dresden, however, and in Berlin-Prenzlauerberg birth control advice was given in 10 per cent and 7 per cent respectively in the years 1929 to 1931.

The next group of applicants are women, who come for a physician's certification for a therapeutic abortion. In most of the German states two, and in some, three physicians' certificates are needed to get the women's hospital, that is, Government institutions, to induce a therapeutic abortion. Such certificates are given free of charge in the municipal centers if the status of health of the applicant indicates this procedure. The Frankfurt center reports that for a period of six years, 46 per cent of its cases applied for therapeutic abortion, while in 1930, there were only 36 per cent that did so. The number of applications for therapeutic abortions decreased, while the applications for contraceptive measures increased. The various marriage advice centers list from 2.5 to 10 per cent of the total applicants as seeking certification for abortion. A great many requests are not granted, lacking medical indications. The Frankfurt center reports for 1929 and 1930 a lack of medical indications for attestation for a therapeutic abortion in 186 cases; the total number of cases for these years is not given. Of these, 145 were married and 41 were single. At the time of reporting, 49 children had been born and in 19 cases pregnancy was not yet at term. Spontaneous abortion was recorded in 31 cases and 45 are believed to have been artificially induced abortions. Thus somewhat more than one-third of the 186 pregnancies could have resulted in living issue. The Berlin-Kreutzberg center for 1931 reports inadequate medical indications for attestation for therapeutic abortion in 49 cases or 4.5 per cent of its total applicants, and in 1929 there were 46 cases or 12 per cent of the total applicants.

All sorts of estimates on the extent of the practice of abortion are circulated in Germany and elsewhere, but supporting data have not been published so far. The medical groups, the Krankenkassen, as well as all groups interested in maternal health are much concerned about the increasing number of abortions. Definite efforts are made to combat abortion by teaching the women methods that are less harmful to their physical and mental health by the prescribing of contraceptive methods in maternity hospitals and gynecologic clinics.

Certification for sterilization is still another part of the work. The Frankfurt center reports that 435 patients were recommended for sterilization operation, or, 5.6 per cent of its total cases, while in Lübeck<sup>20</sup> sterilization, operation was advised in 12 per cent of the total cases for the year of 1931. The Dresden<sup>21</sup> center in 184 or 5.2 per cent of its 3140 patients, who had applied for premarital consultation during the years from October, 1926, to January, 1930, advised on eugenic grounds against having children. Some of these had been sterilized, and some had been given contraceptive advice. The State and sometimes the Ortskrankenkassen, or the applicants themselves, carried the financial burden of those operations in Dresden, in Lübeck, and in Frankfurt-am-Main.

Involuntary sterility is the fourth cause bringing married people to the advice center. It is estimated that one in ten couples is involuntarily sterile in Germany, Austria, and Switzerland. However, figures to support such estimates are not available. The Dresden centers have a good many applicants falling into this category, and the Bund für Mutterschutz also lists in its various centers a number of cases of involuntary sterility.

In the Dresden center it was found that azoospermia was the reason for the sterility in two-thirds of the cases applying for advice on this problem. There is no statement on the underlying causes of this condition, nor about causes of sterility in the woman. The data also do not give the number or the percentages in relation to the total number of 5596 patients who were advised during the period from October, 1926 to January, 1933.

Men and women, married and unmarried, who want guidance on sex and other personal problems, constitute the third main group of applicants. They are reported for example, in Dresden and Hamburg, in about one in three cases, and in Berlin-Friedrichshain one in five.

The scope of the marriage advice centers covers, beyond the strictly medical cases relating to propagation a large number of various conflicts in marriage, personal problems affecting family relations, and these are the real test of adequate marriage counsel. Such difficulties often are a result of ignorance of the marital relationship, or, they may be purely economic or arise from outside interference. More fundamental still, these may be of a change in attitude toward each other, which creates difficulties of psychologic adjustment. Frequently it is the causative factor in the breaking down after a number of years of successful married life, and may even lead to a divorce. In most of the marriage centers, legal advice is available, and in many centers the lawyer has office hours at the same time as the medical adviser, thus saving the patient's time and money to return to the center for a second consultation.

Statistical data on legal advice, which were published in Dresden<sup>22</sup> on applicants for 1930, give a good picture of the type of reasons for coming to the center. The 326 applications fall into the following categories: Cruelty and drunkenness making for the disruption and disintegration of the family are listed in two-fifths of the cases. Economic questions of household management and questions of property rights are one-fifth, adultery is somewhat less than one-fifth, and legal questions on marital rights are one-eighth. The social status of these applicants is that of the workman in various trades, and clerks in offices. Among these families one-third are childless, one-third have one child, and the remaining have two or more children. Needless to say, the group with the greater number of children is identical with the group which has difficulties in budgeting and household economies, showing that in a large number of so-called marital maladjustments the causative factors are of a financial nature.

The outstanding advantage of the marriage advice center is the opportunity it affords the consultant to get unbiased advice on eugenic questions and on sex problems. His private physician might not offer advice so readily for financial and other considerations concerning which the patient often feels less embarrassment in consulting a stranger.

#### SUMMARY

The marriage consultation movement received its impetus from several sources. First, from such advances in scientific knowledge as those made by Mendel, Darwin, and later applied by Galton. Second, from problems of disease, poverty and other social ills, which severely taxed public and private resources. Third, from changes precipitated by the World War, such as loss of men, shortage of dwellings, an accelerated falling of the birth rate and an increase in divorcees.



From the university groups interested in public health and race improvement, the eugenic ideal of the sacred duty of every human being to pass on a good heredity was upheld in the classroom, through personal conferences, on the lecture platform, and in writing. In this way, it was carried over to leaders in the community, and in some degree to the general public.

The private agencies gradually perceiving the applicability of such teachings to prevalent social and physical ills, actively promoted discussion, and even advocated such definite measures to keep the unfit from propagation as exchange of marriage health certificates, birth control, therapeutic abortion, and sterilization. A general movement, sponsored by the Society for the Protection of Motherhood, at first proved distinctly unpopular, but finally won recognition, and even support from the Government.

Today there are over a thousand consultation centers in Germany, under municipal auspices, sickness insurance, or private control. By far the largest number of consultants turn to the Krankenkassen and to the municipal centers. At present consultations are free of charge.

The marriage consultation centers for the most part are directed by physicians with certain special qualifications, who are chosen from the civil service list. It is generally felt that the experiment will stand or fall by the personal merits of the counselors, because of the high degree of tact, understanding and sensitiveness called for which no amount of specific training can supply. The physician schooled in public health and general medicine takes precedence over those specializing in any particular domain of clinical medicine, partly to avoid the danger of over-emphasizing the particular speciality, and partly from a variety of other reasons. The urologist, for example, is not regarded as a happy choice, as persons might be deterred from seeking advice because of the fear of being suspected by others of having a venereal disease. The choice of a gynecologist or obstetrician is not viewed with favor because the centers wish to limit their service to consultation and advice, a task considered more difficult in these specialties where the patient recognizing the close relationship between the technic of examination and treatment, expects to receive treatment also. An added objection arises because the nature of the specialty naturally leads to an expectation that birth control instruction may be readily obtained. Hence the broader purpose of giving marital advice on any problem may, it is feared, narrow to the giving of contraceptive advice only. Still other considerations render the psychiatrist or tuberculosis specialist a less desirable choice. Some authorities have called attention to the danger not only of letting hereditary factors overrule human considerations, but of inducing a hypochondriacal condition by overemphasis of the individual's potentialities for hereditary taints.

At present advice and guidance are sought chiefly in relation to family problems. Advice in the sense decreed by the Government, namely to determine mental and physical fitness for marriage and propagation represent a relatively small proportion of the total number of applicants. The people had not been sufficiently educated in advance to respond to a decree calling for race improvement. Apparently the necessity of awakening a eugenic consciousness through years of educational work with the public had not been sufficiently stressed. Furthermore even now scientifically documented material in the heredity prognosis of various conditions is available in but a limited number of diseases.

In general the centers give advice only. If treatment is required, the applicant is referred to medical or social welfare agencies. An outstanding exception is the giving of contraceptive instruction in certain centers.

With the rapid advance in science and consequent changing concepts, public confidence in medical, legal, and even spiritual advisers had been severely undermined. People everywhere were groping for new light on their personal problems. Gradually these groups recognized that they must meet the changing situation and devise means of satisfying new demands by establishing consultation centers.

So far no systematic analysis of the available case material has been attempted. The policies of the various centers are not sufficiently defined and standardized to permit evaluation. A noticeable increase in the number of applicants is in itself no criterion of effectiveness. Leaders in the movement increasingly recognize the need of knowing how many families, or individuals have definitely benefited from the advice given, and how many cases were helped by the treatment for which they were referred elsewhere. They are now planning uniform records that will form the basis of comparable statistics in the field. At present it is impossible to judge conclusively the ultimate value of the whole endeavor, particularly as few of these centers have been in operation as long as five years.

An important by-product of marriage consultation service is the detection of pathologic conditions of which the consultant is often totally unaware. By continually referring such patients for treatment, these centers render valuable service in the field of preventive medicine.

19 EAST THIRTY-FIRST STREET.

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# Department of Maternal Welfare

CONDUCTED BY FRED L. ADAIR, M.D., CHICAGO, ILL.

## PRENATAL WORK IN NEWARK, N. J.

**A**BOUT 1925 the Maternal Welfare Commission of the Essex County Medical Society began a study of the maternal mortality in Newark, N. J.

The survey showed an utter lack of prenatal care. Only a small percentage of the expectant mothers received any care whatsoever.

With this information on hand, the Maternal Welfare Commission interested the City Commissioners and as a result, the Prenatal Welfare Center, under the Department of Public Works, was organized in June, 1926. This is the only organization of its kind under municipal control in this country.

The Director of Public Works, cooperating with the County Medical Society, appointed a Medical Advisory Board consisting of eight physicians with Dr. J.

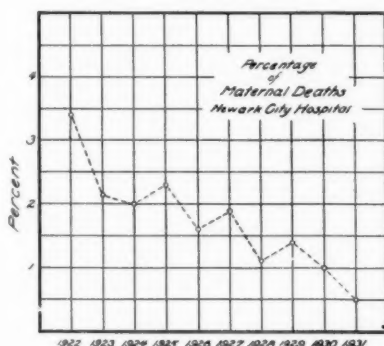


Fig. 1.

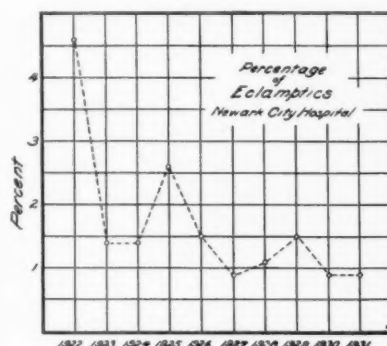


Fig. 2.

N. Pannullo of Newark, as chairman, who are connected with the various hospitals in the city having obstetric services. The Medical Director of the Center, Dr. E. H. Snively, is the Medical Director of the Newark City Hospital.

This Prenatal Welfare Center stands ready to aid the medical profession in spreading the gospel of prenatal care to the expectant mothers who cannot afford the services of private physicians.

In order to find patients early in pregnancy, nurses conduct a house-to-house canvass as they go about their districts caring for those patients who have been reported by physicians, midwives, health and welfare agencies, or who have applied for care themselves. The nurses do not give care to the private patients of physicians unless approved by the physicians.

The supervision during pregnancy consists of visits to each patient in her home and the visits of the patient to the physicians at the various clinics operated by the Center.

There are four of these weekly prenatal clinics located in different sections of the city, each clinic having two physicians and two nurses in attendance.

The patients' visits to the clinics make possible medical supervision for those patients who will be delivered by midwives and those who delay in engaging their own physicians, or registering at hospitals or those who cannot afford to pay for prenatal care.

At the clinics a complete physical examination is made. This includes examination of head, chest, blood pressure, urinalysis, pelvic measurements, and Wassermann test. Patients are urged to return to the clinics every two weeks for examination up to the eighth month and weekly thereafter. When they fail to do so, or they cannot attend clinics for some reason, the nurses follow up the cases at home.

The city is divided into eight districts with a nurse in each district. The home visits of the nurses include temperature, pulse, respiration, blood pressure, simple urinalysis, instructions as to hygiene, diet, and preparation for delivery. Social problems are encountered and referred to the proper agencies for settlement.

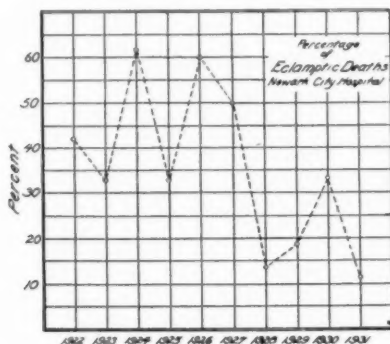


Fig. 3.

In the five years that this Center has been functioning, 14,917 expectant mothers have received prenatal care and they have made 22,101 visits to the prenatal clinics.

Since 1926 when this work started, the maternal death rate has declined yearly. In 1925 there were 88 mothers who died in childbirth of the 10,852 births in Newark. In 1931 there were 34 maternal deaths in 9506 births.

The Prenatal Welfare Center had 59 maternal deaths out of 14,917 cases in its five years of existence. These patients were practically all in the indigent class and a large percentage was colored. Of the 59 deaths, only 31 were obstetric deaths, the others being medical conditions, such as pneumonia, cardiacs, advanced tuberculosis, cancer, etc., which have complicated pregnancy.

The advantage of the prenatal work is well shown in the charts of the percentage of eclampsias and maternal deaths in the City Hospital, where the majority of these patients were delivered.

The Prenatal Advisory Board firmly believes that the Prenatal Center has helped lower maternal mortality, and educated the laity to the necessity of prenatal care.

# Department of Reviews and Abstracts

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CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

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## Selected Abstracts

### Endocrinology

**Fluhmann: Anterior Pituitary Hormone in the Blood of Women, Endocrinology 15: 177, 1931.**

Fluhmann applies the Aschheim-Zondek procedure to the examination of the blood of nonpregnant women and thinks it has important clinical significance. The technic of the test is described in a previous article by him and the present report is based on the results of the test performed on 280 nonpregnant women in whom no gross lesions of the pelvic structures could be demonstrated, and including 178 cases used in previous papers. The study resulted in the classification of four main groups of patients: (1) Normal ovarian function; (2) Hypohormonal conditions; (3) Afunctional conditions and (4) Hyperhormonal conditions.

Several possibilities in each group are considered.

Conclusions: (1) Normal ovarian function: The test has been found negative in patients with a normal twenty-eight-day menstrual cycle. (2) Hypohormonal conditions: The test has also been negative in women with irregular, delayed, scanty, or absent menses. It would seem that this group offers the most favorable prognosis for treatment with "ovary-stimulating" extracts. (3) Afunctional conditions: The presence of large amounts of anterior pituitary sex hormone has been demonstrated in a large percentage of patients with a total deficiency of ovarian function, such as occurs after operative extirpation of the ovaries, radiation castration, and in the postclimacteric period. It is probable that some women with prolonged periods of amenorrhea, and frequently accompanied by obesity, also belong to this category. (4) Hyperhormonal conditions: One-third of younger women with polymenorrhea and patients of the menopausal age with menstrual irregularities have also shown excessive amounts of the anterior lobe sex factors in the blood. It is possible that this is due to a primary hyperfunction of the anterior hypophysis which results in an excessive production of ovary-stimulating substances.

WILLIAM KERWIN.

**Loeser, Alfred: The Skin as a Hormone Bearer During Pregnancy, Zentralbl. f. Gynäk. 56: 1155, 1932.**

Skin was obtained from 14 pregnant women, either during laparotomy for intercurrent disease or during cesarean section at term. It was denuded of underlying tissue, and pieces not less than 10 by 10 mm., weighing at least 100 mg., were implanted under the skin of infantile rats, castrated infantile and castrated adult rats. The Allen-Doisy test was negative in every instance, however, ripe follicles, estrus, and (when large pieces of skin were used), corpus luteum were found. The



greatest amount of hormone in the skin was ascertained in early pregnancy (four to six weeks), less was found at the 4-5 month period, and the least amount in skin of patients at term. At least five times as much urine as skin (by weight) is necessary to give a reaction. The author realizes that lymph and serum are implanted with the skin and that this constitutes an objection to the study.

The question was raised as to whether the concentration of hormone in the skin has anything to do with skin pigmentation during pregnancy, but skin taken from the linea nigra and from other parts of the abdominal wall of the same individual did not give any appreciable difference in reaction.

WILLIAM F. MENGERT.

**Anselmino and Hoffman: Increase of Hormones of Posterior Lobe of Hypophysis in Blood of Pregnant Women and Its Relation to the Type and Severity of Clinical Manifestations in Nephropathy and Eclampsia, Arch. f. Gynäk. 147: 549, 1931.**

The authors determined the antidiuretic component of the hormone of the posterior lobe of the hypophysis and the blood pressure increasing portion in the blood of 21 pregnant women suffering either from nephropathy of pregnancy or eclampsia. The quantity of the antidiuretic substance found was directly proportional to the severity of the pathology present. Thirty hours following delivery, this antidiuretic substance had disappeared from the blood stream. The one exception, where it persisted, was a woman suffering from puerperal eclampsia. This antidiuretic substance could not be found in the blood of healthy gravidæ or in those suffering from simple edema. The blood pressure increasing substance was found in all women suffering from definite hypertension. This blood pressure increasing substance and the antidiuretic substance apparently occur independently of each other.

RALPH A. REIS.

**Parfenoff, N.: The Relationship Between the Uterus and the Ovaries, Monatschr. f. Geburtsh. u. Gynäk. 88: 423, 1931.**

From a study of the literature and his own animal experiments, Parfenoff concludes that removal of the uterus in white rats produces severe degenerative changes in the ovaries especially in the follicle apparatus. These changes are not dependent upon lesions of the circulatory or nervous connections of the uterus. The latter organ possesses the ability to produce a hormone which stimulates the function of the ovaries by way of the blood stream. The pseudocorpora lutea must be considered histologically chiefly as of connective tissue origin but also in part of epithelial origin. They develop at the site of, and at the expense of, the growing follicles. Extirpation of the uterus stimulates the development of the interstitial glands which because of their growth lead to atrophy of the follicles.

J. P. GREENHILL.

**Engelbach: Endocrine Factors Related to Genital Development, Am. J. Surg. 19: 72, 1933.**

Engelbach divides the general scheme of the interrelationship of the glands of internal secretion into two hormonal phases. The first phase is that of the action of the hormones of the thyroid, pituitary, suprarenal cortex and the placenta (in the female) upon the follicle of the ovary, and the spermatie capsule of Sartoli of the testicle. The hormonal action of these endocrine glands induces cytologic and

functional changes in the follicle and the spermatic capsule which in turn result in a liberation of the hormones from these structures. The second phase is that resulting from the hormones of the ovary and the testicle upon their accessory structures such as the uterus, endometrium, tubes, vagina, and mammary glands in the female, and seminal vesicles, prostate, and external genitalia in the male. The direct action of thyroxin upon gonadal function is that of inhibition as demonstrated by the female cretin in whom thyroxin is deficient, but who has an earlier period of maturity. The author states that the hypophysis is the most important internal gland in the body, and is the center of hormonal action. Its eosinophilic cells furnish the body with the growth hormone, while the basophilic cells are the origin of the pituitary sex hormones. The normal balance of the hormonal phases as well as the hormones themselves offer normal growth and sexual development to mankind. Four illustrative cases are reported of the hypopituitarism and adiposogenital variety which were definitely helped by hypodermic injections of the pituitary growth hormone.

J. THORNWELL WITHERSPOON.

**Malinovsky, Kushnir, and Petroff: The Mitochondrial Structure of the Cells of the Corpus Luteum Menstruale, *Acta Gynaec.* (Moscow Edition) 1: 7, 1930.**

The authors describe in detail 14 corpora lutea studied in different periods of the menstrual cycle.

In summarizing, they emphasize two points:

1. The young cells of the corpus luteum just beginning to function show the granulated mitochondrial structure. A corpus luteum taken on the thirteenth day after the beginning of the last menstruation, from the standpoint of morphologic metabolism, still shows signs of retrogression, but when taken after the fifteenth day, exhibits a granulated mitochondrial structure. For this reason they consider the beginning of the development of the corpus luteum, i.e., ovulation, to be fourteen or fifteen days after the first day of the last menstruation.

2. The most intensive functional activity of the cells takes place in the first five to seven days of life of the corpus luteum.

The authors do not agree with the opinion of Robert Meyer that the so-called maturity of the corpus luteum continues until the beginning of the next menstruation and insist that from the seventh day of the life of the corpus luteum until the moment of the beginning of menstruation, the process of gradual exhaustion continues in the cells and that the period of maturity in the sense of morphologic metabolism begins even in the period of vascularization. Also their second conclusion disagrees with the theory of Robert Meyer that the corpus luteum continues to mature as long as the ovum is alive. The authors find that the vitality of the corpus luteum can in no way be connected with the vitality of the ovum and on the basis of the facts about the morphologic metabolism of the cells of the corpus luteum, they conclude that the life of the ovum is much shorter than the life of the corpus luteum.

ALEXANDER GABRIELIANZ.

**Lvov, N., and Freiman, S. X.: The Interstitial Gland of the Human Ovary, *Acta Gynaec.* (Moscow Edition) 1: 25, 1930.**

The authors studied the ovaries of 46 individuals of all ages ranging from that of a four months' fetus to that of a woman aged 60 years. They also examined ovaries of four women who died in the first half of pregnancy. Altogether they

studied 1000 microscopic sections stained with (1) haemotoxylin-eosin; (2) by the Van Gieson, and (3) by the Weigerth-Hart method for elastic tissue. The authors came to the conclusion that the interstitial gland is present in human beings as a well-developed formation only before the beginning of sexual maturity, but is far from constant even at that age. It was observed only in 6 cases out of the 46. In the fetal stage, no well-marked interstitial gland was found.

ALEXANDER GABRIELIANZ.

**Campbell, A. D., and Collip, J. B.: Further Clinical Studies on the Anterior Pituitary-like Hormone of the Human Placenta, Canadian M. A. J. 25: 9, 1931.**

This series comprises 40 menorrhagias and metrorrhagias in patients free from pelvic infections and palpable tumors. From 1 to 2 c.c. of specially prepared extract were given subcutaneously every twenty-four to forty-eight hours for varying periods, depending upon the condition and history of case, each c.c. containing 40 rat units.

It is felt that simple menorrhagias are helped by the administration of this therapy for one week before the epoch, while the severe types require therapy for twelve weeks or more to correct the periods. After correction the metrorrhagias are not prone necessarily to have normal periods, and even amenorrhea may develop. Curettage sometimes shortens the period of treatment. Severe dysmenorrhea subsequent to treatment "may be of prognostic value."

H. CLOSE HESSELTINE.

**Collip, Thomson, Browne, McPhail, and Williamson: Placental Hormones, Endocrinology 15: 315, 1931.**

The authors give a brief account of the methods used and the results obtained in studies on placental hormone. Human placentas were used. Emmenin, the term applied to the hormone procured from placentas, by oral administration, produces estrus in immature female rats in from three to five days. No effects were observed in either young or mature male rats treated with emmenin. In no instance has there been any evidence of the formation of corpora lutea nor at any time has true hypertrophy of the ovaries been observed. The extract is without effect on adult castrates unless very large doses are given. If any effect occurs it is attributed to estrin which had not been removed from the extract. Emmenin does not shorten the time of the appearance of normal puberty and maturity.

Physiologic effects of the second principle which they have obtained from human placentas in the form of purified extract of a protein-like substance, are as follows: Immature rats injected daily for three days manifested estrus on the third to the fifth day. With a minimum dose both gross and microscopic examination of the ovaries show very little effect, whereas, if the dose is trebled the ovaries show young corpora lutea and healthy follicles in the course of maturation. Continued daily administrations resulted in the appearance of normal cycles at four- or five-day intervals. Even after weeks of such treatment the ovaries on examination correspond with those of normal adults showing a rapid growth at first, which, however, does not go beyond normal adult size. If both substances are administered simultaneously for a prolonged period the cycles are broken and a long period of diestrus results. The ovaries after three weeks of such treatment are extensively luteinized and greatly enlarged. Suggestions for the clinical use of the two placental extracts are given.

WILLIAM KERWIN.

**Kovacs, F.: The Pathology of Hirsutism and Virility, Monatschr. f. Geburtsh. u. Gynäk. 91: 65, 1932.**

Kovacs reports a rare case in which a woman developed among other masculine characteristics a marked increase of hair all over the body and especially a full-grown beard. This is the first recorded case in which the removal of the ovaries in a patient who did not have a suprarenal tumor, resulted in hirsutism. The author draws a practical conclusion from this case, namely that the removal of both ovaries may in certain cases not only lead to the usual symptoms of the menopause but it may also result in severe somatic and biologic disturbances. Therefore in a deliberation between surgical and radiation castration we should take into consideration not only the patient's age, family and relationships, etc., but also where possible the constitutional type of the individual with special reference to the intersexual type and latent heterosexual peculiarities.

J. P. GREENHILL.

**Bokelmann and Scheringer: The Influence of Castration on the Thyroid in Female Albino Rats, Arch. f. Gynäk. 148: 1, 1932.**

The authors found that the thyroid gland of female albino rats becomes smaller in size and richer in iodine content following castration. A decrease in the size of the thyroid or an increase in iodine content alone are of no significance; when found combined, however, it must mean that definite ovarian atrophy is taking place. This functional and structural atrophy begins promptly after castration and is demonstrable within five weeks.

RALPH A. REIS.

**Englehart: The Action of Suprarenal Cortex on the Genitalia of White Female Rabbits, Arch. f. Gynäk. 149: 688, 1932.**

Extract of suprarenal cortex produces a marked hypertrophy of the uterus and breasts of female rabbits. Injected into rats, it produces estrus. Liver and brain extracts were used as controls but results obtained by the use of these latter substances were slight. The effect of the injection of the extract of suprarenal cortex occurs even after extirpation of the ovaries and is similar to that produced by the female sex hormone.

RALPH A. REIS.

**Danaff, Georg: Some Observations on the Effect of Thymus Extracts on the Uterus, Zentralbl. f. Gynäk. 55: 2706, 1931.**

Thymus extract obtained from prematurely and stillborn children was injected under the skin of the back of female mice and guinea pigs which were in the second half of pregnancy, in three doses of  $\frac{1}{2}$  and 1 c.c. respectively, in the course of twenty-four hours, and labor was instituted in all. Similar injections in non-gravid females produced hyperemia and swelling of the genitals and hypertrophy of the uterus. No result was seen on the extirpated, nonpregnant uterus of the guinea pig, but intramuscular injections into the animal with the uterus in situ produced seemingly painful contractions of the organ. Thymus extract from very young animals gave no results. Extracts of other ductless glands gave no appreciable results in connection with the birth process with the exception of adrenalin, which in a single instance appeared to accelerate the action of thymus. The

author concludes that his results make it seem probable that beginning secretion of the thymus of the fetus is an important factor in the causation of labor.

WILLIAM F. MENGERT.

**Tschaikowsky, W. K.: Physiologic Action of Folliculin Upon the Pregnant Uterus, Zentralbl. f. Gynäk. 56: 395, 1932.**

Before proceeding to the main part of his paper, the author reviews several facts concerning the hormones of pregnancy: (a) the folliculin content of the serum rises toward the end of pregnancy; (b) the prolactin content does not rise and even falls during the last three months; (c) corpus luteum is in regression at the end of pregnancy and inhibits the sensitiveness of the uterus for posterior pituitary.

Twenty-two white mice in the second half of pregnancy were injected with 2.5 c.c. of a lipoid emulsion of folliculin daily for several days. Two or three days after the injections were begun energetic contractions of the uterine horns appeared within twenty to twenty-five minutes after the previous injection. The pains which came at three- to five-minute intervals and lasted one to one and one-half minutes, slowly disappeared two or three hours later. Usually the mice aborted three to four days after injection, and the nearer they were to the end of pregnancy the more energetic were the uterine contractions. The following conclusions were drawn: Folliculin sensitizes the uterus for the action of posterior pituitary hormone. It raises the restraining action of corpus luteum on posterior pituitary. The decrease of prolactin production at the end of pregnancy causes diminished luteinization of the ovaries and therefore promotes the supremacy of folliculin over corpus luteum.

Therefore, weak pains during labor are an expression of an overproduction of corpus luteum or an insufficient production of folliculin.

WILLIAM F. MENGERT.

**Hamblen: Clinical Experience With Follicular and Hypophyseal Hormones, Endocrinology 15: 184, 1931.**

Hamblen reports the clinical results obtained with theelin and anterior pituitary luteinizing hormone. He cites forty case reports and summarizes the results of treatment as follows:

Thirteen patients with menopausal symptoms were treated. The relief of subjective symptoms was excellent in 8 patients and good in 4. One patient received no benefit. There was no effect on menstruation in 10 cases; menorrhagia developed in one patient; menstruation became more regular in two patients.

In 10 patients with amenorrhea (primary and secondary) the relief of associated symptoms was excellent in 7, good in 3. Menstruation was initiated in the four patients of the primary type of amenorrhea; menstruation recurred in 5 of the 6 patients with secondary amenorrhea.

Of 8 patients with oligomenorrhea the relief of the associated symptoms was excellent in 4 and good in the remaining 4. In all cases menstruation became more regular and the flow was of a more normal type.

Among 6 patients with idiopathic menorrhagia in 4 there was no benefit; in the two in which parathormone and calcium lactate were used in addition to theelin the results were excellent.

In 3 patients with hyperemesis gravidarum vomiting ceased. One patient returned after three weeks with an incomplete abortion.

WILLIAM KERWIN.



**Laqueur, Wagner, von den Velden and others: Evaluation of Ovarian Hormone Therapy, A Symposium Before the Berlin Medical Society, Deutsche med. Wehnschr. 58: 959 and 992, 1932.**

The recent advance in biologic research toward the identification and isolation of the ovarian hormones has so far failed to produce a simple and reliable test with which indications and results of hormone substitution therapy can be appraised in a manner approaching the exactness of the biologic experiment. The impressions of the clinician are still for the most part the sole guidance in this broad field of therapeutic endeavor. However, the impression is prevailing that the new preparations, either of pure follicle hormone or ovarian extracts with standardized contents of follicle hormone, are of distinct value in treating the general symptoms of premature or artificial menopause, in restarting menstruation if amenorrhea is due to insufficiency of the follicle apparatus, and in the treatment of endocrine arthropathies where results have been also obtained in male patients.

More uncertain is the indication in most cases of hypoplasia of the uterus with menstrual disorder, in metrorrhagia due to ovarian dysfunction and in cases of sterility. The most emphatic recognition of the new preparations comes from a psychiatrist: Climacteric depressive psychosis often yields in a very short time to a treatment of three times 200 M.U. of follicle hormone daily. Oral administration of follicle hormone is generally conceded to be as efficacious as parenteral injections in most cases amenable to treatment.

G. E. GRUENFELD.

**Webster, Bruce: Ovarian Follicle Hormone Therapy in Ovarian Insufficiency and the Menopause, Am. J. Med. Sc. 184: 822, 1932.**

A series of 20 cases is presented in which the intravaginal administration of the ovarian follicle hormone has been alternated with controlled periods. It would appear that the preparation of the hormone used was physiologically active in humans as evidenced by the induction of uterine bleeding. Additional data are presented which suggest that this hormone of the ovarian follicle is of definite clinical therapeutic value in the treatment of the disagreeable symptoms which may accompany the menopause and of the amenorrhea due to an insufficiency of this hormone. No beneficial results were obtained when the hormone was administered to cases of amenorrhea which showed clinical evidences of an anterior pituitary etiology.

J. THORNWELL WITHERSPOON.

**Azevedo: The Use of Insulin in the Treatment of Menorrhagias of Ovarian Etiology and in Particular in Hemorrhagic Metropathy, Rev. de gynec. e d'obst. 7: 358, 1932.**

The author discusses those cases of uterine bleeding in which a microscopic examination of the endometrium demonstrates a glandular hyperplasia, distinctly different from the menstrual mucosa. This peculiar hyperplasia is due to the disturbed ovarian function, and responds to insulin therapy. Several investigators have found that there is a definite relationship between the pancreas and the ovary. Insulin is also indicated in the menorrhagias occurring during the course of acute and chronic inflammations of the adnexa.

The dose of insulin is usually 20 to 40 units per day. In some cases the dose must be increased, preferably administered in divided doses throughout the day. Several cases are reported which responded to insulin therapy when all other methods of treatment had failed.

JAMES M. PIERCE.

**Roques, Frederick:** *Thymophysin*, J. Obst. & Gynec. Brit. Emp. 39: 320, 1932.

Freshly prepared Thymophysin which had been kept on ice was used on 100 primiparas, and the records of the preceding 100 primiparas were taken as control cases. No patient was given Thymophysin who had: disproportion, nonengagement of head at onset of labor, malpresentations, any condition in which the blood pressure was raised, or any other complication such as cardiac disease. It was found that Thymophysin did not shorten labor or any of the stages of labor whether it was given early or late, the average duration of labor in the cases given the drug being twenty hours forty-seven minutes as against nineteen hours thirty-two minutes in patients who did not receive the drug. The incidence of perineal laceration was about the same, 28 in those receiving Thymophysin as opposed to 30 in those who did not receive it. The forceps rate was approximately the same, 13 in those receiving it as against 12 in those not receiving it. Five out of 6 patients on whom the effect on the blood pressure was studied, showed a transient increase to 10 to 20 mm. Hg. in ten minutes.

WILLIAM F. MENGERT.

**Wintz, H.:** *Agomensin and Sistomensin*, Monatschr. f. Geburtsh. u. Gynäk. 91: 224, 1932.

Agomensin and sistomensin have been used by Wintz for the last eighteen years. Agomensin is a water-soluble solution of corpus luteum whereas sistomensin is a fat-soluble solution. The author obtained excellent results with agomensin in selected cases of amenorrhea and in cases where he feared pregnancy might be interrupted, especially those of habitual abortion. He also produced favorable effects in cases of hyperemesis gravidarum and in patients with troublesome disturbances of the menopause.

Sistomensin, on the other hand, proved very useful in cases where there was excessive bleeding at puberty and also in cases of dysmenorrhea and polymenorrhea.

J. P. GREENHILL.

**Laffont, A., and Fulconis, H.:** *The Use of Urine of Pregnant Women in the Treatment of Certain Menstrual Disturbances*, Bull. de la Soc. d'Obst. et de Gynéc. 4: 243, 1931.

It is well known that the urine of pregnant women contains a large amount of anterior pituitary hormone. Laffont and Fulconis injected such urine into the rectum of women who complained of dysmenorrhea and amenorrhea. Injections were given every second day up to 8 c.c. in amount. Most of the patients had neither local nor general reactions but a few had fever and pains in the ovarian and lumbar regions. Favorable results were obtained in many cases and the authors attribute this to the follicular hormone.

J. P. GREENHILL.

## Item

### AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

At the recent examination and subsequent meeting of the American Board of Obstetrics and Gynecology held at the Milwaukee County General Hospital, Milwaukee, June 13, 1933, the following were approved for certification by this Board.

ABBENE, M. L.	BROOKLYN, N. Y.
ASCHMANN, T. H.	KANSAS CITY, Mo.
BERNSTEIN, ABRAHAM	SAN FRANCISCO, CALIF.
DE CARLE, D. W.	SAN FRANCISCO, CALIF.
DIECKMANN, W. J.	CHICAGO, ILL.
DRABKIN, CHARLES	ST. LOUIS, Mo.
FALK, H. C.	NEW YORK, N. Y.
FITZGERALD, J. E.	CHICAGO, ILL.
FJELDE, J. H.	FARGO, N. D.
GOETHALS, T. R.	BOSTON, MASS.
GOUGH, J. A.	CHICAGO, ILL.
GREENBERG, S. K.	BROOKLYN, N. Y.
GROGAN, R. L.	FORT WORTH, TEXAS
HALE, F. S.	PROVIDENCE, R. I.
HANLEY, B. J.	LOS ANGELES, CALIF.
HOLMES, O. M.	SAN MATEO, CALIF.
HOLMES, R. W.	CHICAGO, ILL.
HOROWITZ, E. A.	NEW YORK, N. Y.
KAHN, M. E.	BUFFALO, N. Y.
LITT, SOL	CHICAGO, ILL.
LUICKART, RALPH	OMAHA, NEB.
MCCLENAHAN, H. E.	YOUNGSTOWN, OHIO
MAC EACHERN, M. T.	CHICAGO, ILL.
MAC KENZIE, R. A.	ASBURY PARK, N. J.
MANN, BERNARD	PHILADELPHIA, PA.
MENGERT, W. F.	PHILADELPHIA, PA.
O'NEILL, J. B.	ST. LOUIS, Mo.
PEIGHTAL, T. C.	NEW YORK, N. Y.
PUDNEY, W. K.	MONTCLAIR, N. J.
RANDALL, L. M.	ROCHESTER, MINN.
SCHNEIDER, MAX	NEW YORK, N. Y.
SHUTE, E. V.	CHICAGO, ILL.
SINGLETON, J. M.	KANSAS CITY, Mo.
SMITH, F. R.	NEW YORK, N. Y.
TOLLEFSON, D. G.	LOS ANGELES, CALIF.
WALKER, F. C.	INDIANAPOLIS, IND.
WALSER, H. C.	DETROIT, MICH.
WILLIAMS, N. H.	LOS ANGELES, CALIF.
WILSON, R. R.	KANSAS CITY, Mo.
WINKLER, E. G.	BUFFALO, N. Y.

For information regarding subsequent examination dates, etc., apply to Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh, Pa.

## Books Received

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ANTE-NATAL CARE. By W. F. T. Haultain, senior assistant obstetric physician, etc., Edinburgh Royal Maternity, etc., and E. Chalmers Fahmy, assistant obstetric physician, etc., Edinburgh Royal Maternity, etc. Second edition. William Wood & Company, New York, 1932.

GONORRHOE DER WEIBLICHEN GENITALORGANE. Ein Grundriss ihrer Pathologie, Klinik und Therapie. Von Dr. Robert Joachimovits, Privatdozent fuer Geburtshilfe und Gynaekologie an der Universitaet Wien, etc. Mit 45 teils farbigen Abbildungen und 6 mehrfarbigen Tafeln. Verlag von Wilhelm Maudrich, Wien, 1933.

THE SEX TECHNIQUE IN MARRIAGE. By Dr. Isabel Emslie Hutton. Foreword by Dr. Ira S. Wile. Emerson Books, Inc., New York, 1932.

CHAPTERS IN AMERICAN OBSTETRICS. By Dr. Herbert Thoms, associate professor of obstetrics and gynecology, Yale University School of Medicine. Charles C. Thomas, Springfield, Ill., 1933.

PHOTOGRAPHISCHER ATLAS der geburtshilflich-gynaekologischen mikroskopischen Diagnostik. Von Professor Ludwig Fraenkel und Erich Fels, Universitaets-Frauenklinik in Breslau. Mit 132 Abbildungen im Atlas. Verlag von S. Karger, Berlin, 1933.

CHIRURGIE DU SYMPATHIQUE PELVIEN EN GYNECOLOGIE. Par Gaston Cotte, professeur agrégé à la Faculté de Médecine de Lyon, etc. Masson et Cie, Paris, 1932.

LECTURES ON MIDWIFERY AND INFANT CARE. A New Zealand Course. By T. F. Cockrill, lecturer to nurses at Alexandra Maternity Hospital, Wellington, etc. Coulls Somerville Wilkie, Ltd., Auckland, New Zealand, 1932.

BEWERTUNG DER OVARIALTHERAPIE. Von Prof. Dr. Ernst Laqueur, Prof. Dr. G. A. Wagner, und Prof. Dr. R. von den Velden. Verlag von Georg Thieme, Leipzig, 1933.

OUTLINE OF PREVENTIVE MEDICINE for medical practitioners and students. Prepared under the auspices of the Committee on Public Health Relations, New York Academy of Medicine. Editorial Committee: Frederic E. Sodern, Chas. Gordon Heyd and E. H. L. Corwin. Second edition, revised and enlarged. Paul Hoeber, Inc., New York, 1932.

MANOBRAS E OPERACOES OBSTETRICAS. Pela Docente Dr. Joao Pereira de camargo, Faculdade de Medicina da Universidade do Rio de Janeiro, etc. Imprensa Nacional, Rio de Janeiro, 1932.

DAS FRAUENPROBLEM DER GEGENWART. Eine psychologische Bilanz. Von Dr. Alice Ruehle-Gerstel. Verlag von S. Hirzel, Leipzig, 1932.